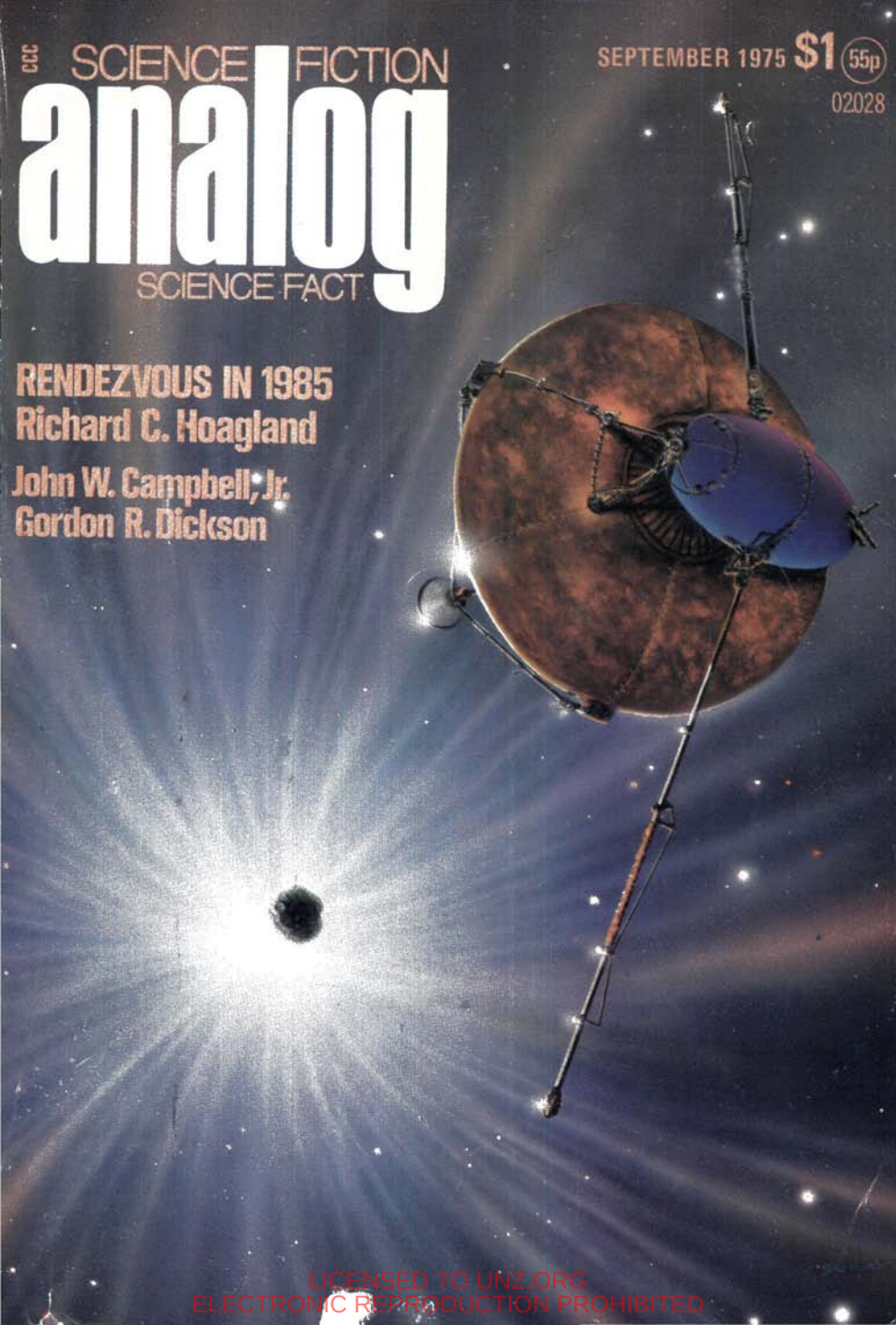
CCC

SCIENCE FICTION analog SCIENCE FACT

SEPTEMBER 1975 $1 (55p)
02028

RENDEZVOUS IN 1985
Richard C. Hoagland

John W. Campbell, Jr.
Gordon R. Dickson



LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

analog

A Calendar of Upcoming Events

August 8-10, 1975: FORTFEST 3 (international Fortean Organization) at the Sheraton-Oakbrook, Chicago, Illinois. Guest of Honor: John A. Keel. Info: Richard T. Crowe, Box 29054, Chicago, Illinois 60629.

September 14-19, 1975: Environmental Sensing and Assessment International Conference (EQC, EPA, UNLV) at Stardust Hotel, Las Vegas, Nevada. Info: Meetings Inquiries, IEEE, 345 East 47 St., New York City 10017.

September 22-24, 1975: Ocean 75 Conference and Exposition (IEEE) at El Cortez Hotel and Convention Center, San Diego, California. Info: Ocean 75 Program Chairman, Marine Physical Lab/Scripps Institute of Oceanography, San Diego, California 92132.

September 24-25, 1975: Computers in Space Projects (September 24) and Aeronautical and Maritime Satellites (September 25) at University College, London, England. Info: British Interplanetary Society, 12 Bessborough Gardens, London SW1V 2JJ, England.

September 28-October 1, 1975: Electronic and Aerospace Systems Convention at Stauffers Inn, Washington, DC. Info: Meetings Inquiries, IEEE, 345 East 47 St., New City 10017.

October 31, 1975: Deadline for entries in the Second Annual New England Science Fiction Association SF Story Contest. Open to New England residents and NESFA members. Info: Box G, MIT Branch PO, Cambridge, Massachusetts 02139.

October 31-November 2, 1975: ICON (Regional Science Fiction Convention) in Iowa City, Iowa. Guest of Honor: Roger Zelazny. Registration: $5 in advance; $7 at door. Info: Greg Frost, Box 510, Iowa City, Iowa 52240.

—Anthony R. Lewis

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Stick it in your ear.

WORLD'S SMALLEST TRANSISTOR RADIO!

Only $14.95

Amazing technological breakthrough—entire AM radio worn on your ear (just 0.6 oz.). No lengthy wires, bulky cases or power-packs. instant entertainment, news, sports 24 hours a day. Inconspicuous mighty mite keeps hands free so you can listen while you **work** (lawn, yard, office, etc.), **watch** (game, beach) or **wait**. Great Christmas gift for sportsmen, teeny-boppers, everybody! No gimmick, this wee wonder has 1 integrated circuit, 11 transistors, patented ferrite antenna / tuner / volume control in 1 dial. Uses normal silver oxide hearing aid batt. (incl.) for approx. 100 hrs. playing. New batt. to slip in avail. at your drug store, about 50¢. Buy with confidence—includes 30-DAY, MONEY-BACK GUARANTEE! We don't normally sell radios, but we went bananas over this incredible discovery. So will you and your giftees. So small and weightless you won't even know you're wearing it!

STOCK NO. 42,275A Just $14.95 Ppd.

GIANT FREE CATALOG!

NEW. 164 Pages. Over 4,500 Unusual Bargains for Hobbyists, Schools, Industry.

JUST CHECK COUPON!

EDMUND SCIENTIFIC CO.
300 EDSCORP BUILDING
Barrington, N. J. 08007
America's Greatest Science • Optics • Hobby Mart

COMPLETE AND MAIL COUPON NOW

EDMUND SCIENTIFIC CO. 300 Edscorp Bldg., Barrington, N. J. 08007

Please send me:

☐ SEND FREE 164 PAGE CATALOG

BANKAMERICARD master charge

_____ EAR RADIO(S) @ $14.95 ea. (No. 42,275A) $_____

Service & handling charge ____.50

☐ Charge my BankAmericard
☐ Charge my Master Charge

Enclosed is ☐ check, ☐ m.o. in amount of $_____

Interbank No. _____ Signature _____

Card No. _____ Address _____

Expiration Date _____ City _____

30-DAY MONEY-BACK GUARANTEE. You must be satisfied or return any purchase in 30 days for full refund.

State _____ Zip _____

HELPING TO DEVELOP AMERICA'S TECHNOLOGY FOR OVER 30 YEARS.

WHEN YOU COME TO PHILADELPHIA BE SURE TO SEE
FREE BICENTENNIAL LIGHT SHOW
IN BARRINGTON, N. J. ONLY 10 MINUTES AWAY AT
EDMUND FACTORY STORE

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

BEN BOVA
Editor

DIANA KING
Associate Editor

HERBERT S. STOLTZ
Art Director

EDWARD MC GLYNN
Advertising Sales Manager

GERALDINE IHRISKEY
Advertising Production Manager

Next Issue on Sale September 9, 1975
$9.00 per year in the U.S.A.
$1.00 per copy
Cover by Rick Sternbach

analog
SCIENCE FICTION
SCIENCE FACT

Vol. XCV, No. 9 / SEPTEMBER 1975

SCIENCE FACT

RENDEZVOUS IN 1985, Richard C. Hoagland 59

NOVELETTES

PRO, Gordon R. Dickson 8
THE RESTORATION, Gordon Eklund 112

SHORT STORIES

BEYOND GRAYWORLD, Gregory Benford 78
THE KILLERS, Karl Hansen 98

READER'S DEPARTMENTS

THE EDITOR'S PAGE, John W. Campbell, Jr. 5
IN TIMES TO COME 75
THE ANALYTICAL LABORATORY 111
THE REFERENCE LIBRARY, Lester del Rey 160
BRASS TACKS 166

COPYRIGHT ©1975 BY THE CONDÉ NAST PUBLICATIONS INC. RIGHTS RESERVED. PRINTED IN THE UNITED STATES OF AMERICA. Analog Science Fiction/Science Fact is published monthly by The Condé Nast Publications Inc., Condé Nast Building, 350 Madison Avenue, New York, New York 10017. S. I. Newhouse, Jr., Chairman; Robert J. Lapham, President; Fred C. Thormann, Treasurer; Mary E. Campbell, Secretary. Second class postage paid at New York, N. Y. and at additional mailing offices. Subscriptions: in U.S. and possessions, $9.00 for one year, $18.00 for two years, $21.00 for three years. In Canada and Mexico, $10.00 for one year, $18.00 for two years, $24.00 for three years. Elsewhere, $12.00 per year, payable in advance. Single copies in U.S. possessions, and Canada, $1.00. For subscriptions, address changes and adjustments, write to Analog Science Fiction/Science Fact, Box 5205, Boulder, Colorado 80302. Six weeks are required for change of address. The editorial contents have not been published before, are protected by copyright and cannot be reprinted without the publisher's permission. All stories in this magazine are fiction. No actual persons are designated by name or character. Any similarity is coincidental. We cannot accept responsibility for unsolicited manuscripts or art work. Any material submitted must include return postage.

POSTMASTER: SEND FORM 3579 to ANALOG SCIENCE FICTION/SCIENCE FACT, BOX 5205, BOULDER, COLORADO 80302.

Editorial and Advertising offices: Condé Nast Building, 350 Madison Avenue, New York, New York 10017

Subscriptions: Analog Science Fiction/Science Fact, Box 5205, Boulder, Colorado 80302

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

How to Get Away with Murder

an editorial by JOHN W. CAMPBELL, Jr.

Editor's Note: Arthur Z. Gray, a long-time friend of John W. Campbell, Jr., recently ran across a letter written to him by John in 1955. He thought it would make an interesting Editorial. We agree, and with the kind permission of Mrs. Campbell, here is that letter—slightly edited to conform with the format of an Analog editorial. Our thanks to Mr. Gray, Mrs. Campbell . . . and John.

Our culture is based on logic, and our legal system accepts logic as Necessary and Sufficient. Thus to prove a crime, it is necessary to establish a logical chain of evidence.

This means that it must be shown that a sequence of events occurred, such that E was predictably caused by D, which was predictably caused by C, which was caused by B, which was caused by A, which the accused did. Thus the accused pointed a gun and pulled a trigger; predictably this caused the hammer to fire the cartridge, which predictably drove the bullet into the victim, predictably causing his death.

But suppose the accused had, instead, simply said "Boo!" and laughed. The victim jumped suddenly, lost his balance, upset a vase onto a table lamp, which was short-circuited by the water and fell, shooting electric sparks, into the victim's lap, electrocuting him. Is this murder?

Answer: Yes, it is—*if the accused could predict (and intend) the chain of events.* But, in a logical culture, no DA would ever attempt to convict the murderer.

Now suppose I initiate a chain of events which has one chance in 100 of causing the death of my enemy, John Doe. In the highly unlikely event that the sequence of events does in fact cause Doe's death . . . no DA will be fool enough to attempt to convict me. Not in a logical culture, he won't.

But suppose that I have, actually, initiated 5,000 different chains of events, each of which has one chance in 100 of resulting in John Doe's death? John Doe is one gone goose; he has practically no chance of surviving.

But I have perfect assurance that I'll survive; one, and only one of those 5,000 event-chains will go to completion—and that one, whichever it may be, is the *only* one any

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

DA could talk about. And that one would be clearly an unlikely, highly improbable, and therefore "unpredictable" chain of events.

I will have committed deliberate, premeditated murder, in perfect security—because I've applied hyperlogical principles in a culture that acknowledges only logical principles. You can *not* get mad at someone for doing something that you yourself hold is impossible; you have to be able to acknowledge that it *can* be done before you can accuse someone of doing it.

(It is fortunate, perhaps, that I am self-disciplined with respect to crime; clearly there are ways of escaping any external discipline this culture can apply!)

I've cast this example in legal terms; it can equally be expressed in a thousand other ways. For example, if a magazine has a perfectly stable circulation of 500,000 copies each issue, this proves there are 500,000 people who buy the magazine regularly every month? Not at all, of course; there is no one-to-one correlation involved, in all probability—but there is a statistical correlation. The correlation is not the *logical* cause-effect relationship, in other words, but a similarity effect. With respect to magazine sales, one individual-who-buys-the-magazine is essentially indistinguishable from another individual-who-buys-the-magazine. It makes no difference that there are 160,000,000 individuals who do *not* buy—any more than the 4,999 low-probability murder-sequences that did not work out have any bearing on the *logical* problem of John Doe's untimely end.

Peg (Mrs. Campbell) threw me a question that, at first brush, sounds like "How long is a piece of string?"—only it's a typical childish question; the kind that is so deep, so penetrating, and so hard to think out that people dismiss it as nonsense.

I'll let you try it: How much evidence is 'enough evidence'?

The getting-away-with-murder technique above is based on consideration of that problem. I've stated that the murder was deliberate, premeditated, and successful—and shown that the rules of evidence as acknowledged in our culture are such as to make presentation of "enough evidence" for a conviction impossible.

I ran an Editorial at one time about "rope reasoning"—logic works like a chain, and is as strong as its weakest link. But rope works differently; there is no single secure system of links from end to end. Every fiber is shorter than the length of the rope, yet the rope is strong. Logically, it shouldn't be, because there is no complete chain of unbroken relationships from end to end.

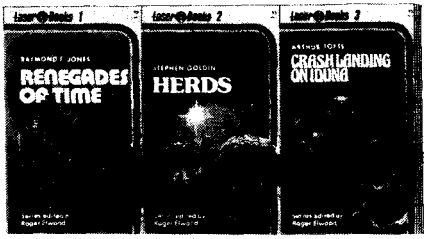
All right, let's consider a rope for a bit. How long must an individual

continued on page 174

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

The Laser Experience

Introducing a bold new series of SF adventure.



LASER BOOKS.
Brave new worlds of adventure.
A bright new concept in science fiction.

The "People" factor

Fantasy and philosophy—that's where most SF is at today. With little emphasis on the characters. But LASERS are about people—people you can believe, experiencing the unbelievable.

America's top SF Editor

Roger Elwood, one of the best SF editors in the world, has personally selected the novels for this unique new series...stories that do more than astonish your senses. They turn on your emotions as well.

Each month... three new books

LASER publishes three original novels every month (the first six are available now). Sold in bookstores everywhere for just 95¢ each, and featuring distinctive cover art by Kelly Freas, they're becoming the foundation of serious SF and adventure reader's libraries.

LASER BOOKS. Diverse, stimulating novels—the kind you'll enjoy again and again. Provocative. Penetrating. And habit-forming.

Laser Books

New Worlds of Adventure.

Laser Reader Service, MPO Box 788, Niagara Falls, N.Y.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

". . . There was no suspicion in the mind of any that the Duke himself was responsible for the death of Facino. It was simply that Facino's death created a situation only to be met by the destruction of the Duke . . ."

Bellarion, by Rafael Sabatini

Shuttling down from the permanent orbital station around the world known as 49381D, Harb Mallard found—on exiting from the transfer pod—a fair-sized clearing on the narrow, pebbled shore of a wide, gray lake combed with rolling waves running from half a dozen winding, water-miles away.

A cool wind blew from the lake, for it was only the beginning of a spring, here. Across the clearing was one large building, evidently a warehouse, and a number of smaller ones, all of cream-color bubble plastic. Beside the buildings, stretching to the green-gray tangled forest wall, were planted fields with the bare inches-high green stubble of winter-sown grain in rows. Hoeing among the rows were four stooped and hairy figures wearing body, arm and leg wrappings of brown or scarlet cloth, and one human with no shirt on his skinny upper body, his half-bald scalp shining redly in the pumpkin-yellow sunlight. Ideal, thought Harb, and went to meet the man.

The man, having seen the transfer-pod land and Harb emerge, was already yelling at his workers, snatching up a shirt and hat and abandoning his hoe. He came toward Harb, sweating, dressing as he came.

"You must be Mallard!" he said warmly, offering a dirty hand which Harb shook—with no distaste but with a certain sense of irony. "I'm Bill Cohone—but you know that, of course. Come on in. Come on in—you could stand a drink, I suppose . . ." Chattering cheerfully, and stuffing his shirt into his pants as he went, he led Harb into the large building, ushered him to a seat, and got them both brandy and water in blackish clay cups.

"Don't you have an overseer to head up the work in the fields, instead of being out there yourself?" Harb asked him.

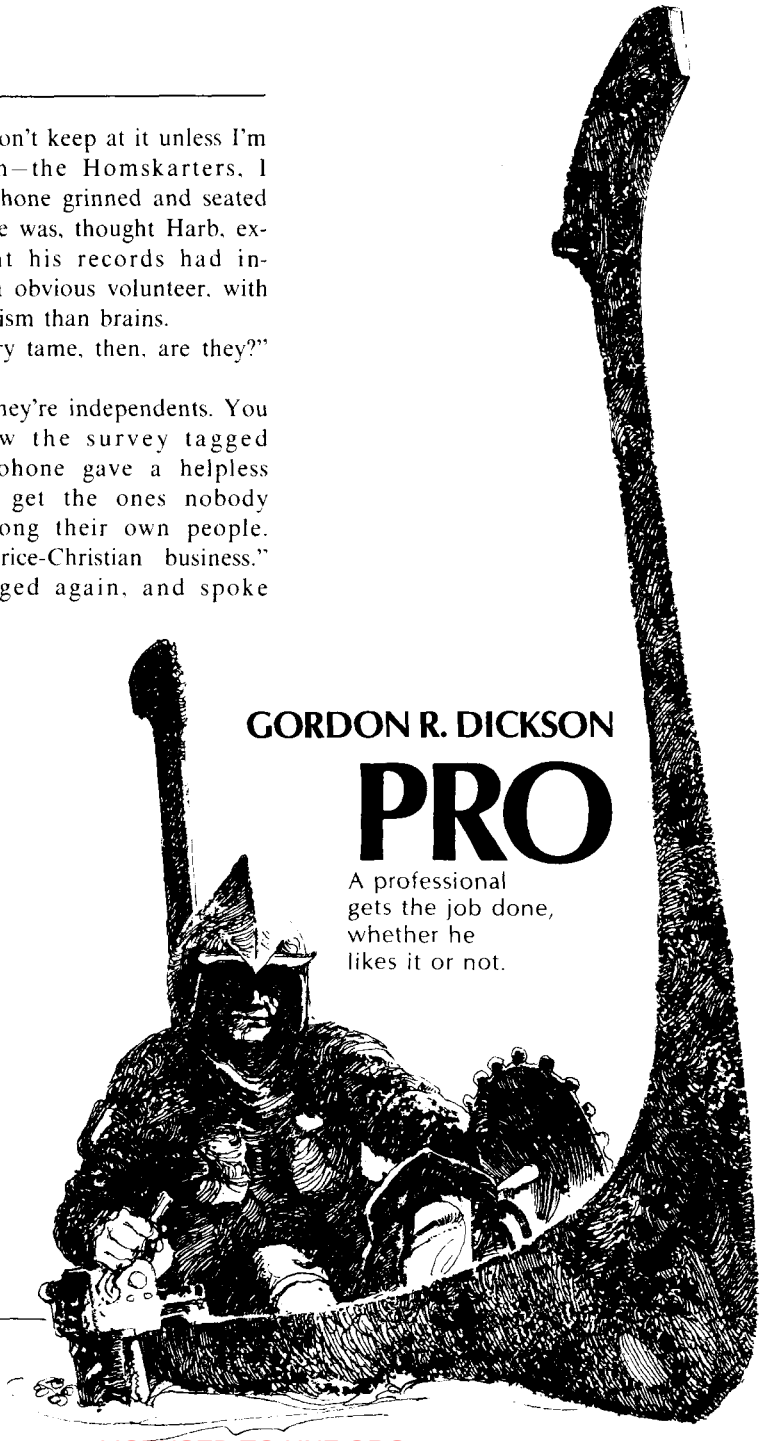
JOHN SCHOENHERR

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

"They won't keep at it unless I'm with them—the Homskarters, I mean." Cohone grinned and seated himself. He was, thought Harb, exactly what his records had indicated—an obvious volunteer, with more idealism than brains.

"Not very tame, then, are they?" Harb said.

"Well—they're independents. You know how the survey tagged them." Cohone gave a helpless shrug. "I get the ones nobody wants among their own people. The old rice-Christian business." He shrugged again, and spoke



GORDON R. DICKSON

PRO

A professional gets the job done, whether he likes it or not.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

apologetically in the candid confessional tone of one talking with a fellow worker. "I'm just sort of a caretaker, here, anyway. I suppose you know I'm a volunteer?"

"Yes," said Harb. He did not bother to rub it in. The breed of man before him was dying out in the Expansion Service. Men of Harb's stamp were taking over. Professional xenosociologists, thought Harb, who were not content to sit and wait for the natives of promising worlds like this one to invite human help. Statistics sounded good, but too often they left you with a hole in your pocket and only a string of impressive figures for comfort.

Harb finished his drink.

"I wish I'd been able to get out here before this," he said, "but the past year since I took over as Sector Chief things have kept me close to Sector Headquarters. I notice the records say you've been here ten local years. That's longer than any volunteer or professional I've got planted on a probable world in my sector. And this is all you've got to show for it?"

The cheerful lines in Cohone's face slowly smoothed out and faded. He stared, with his jaw slack and mouth open slightly. It was the exact expression that would have accompanied a flush of anger and embarrassment in a younger man. But age and sunburn had robbed Bill Cohone of this ability.

"You ought to see the crowds I get on Mondays—that's my medical day," he answered slowly. "And the four Homskarters you see out there aren't the only ones I've had. I've had dozens. They stay a while and then go back to their people. There's a lot of good feeling for us among them. I mean—among the rank and file. Naturally, the kings and chieftains don't lean to us, yet. They don't need us like the plain people do."

"But they're the ones you've got to convince," said Harb, coolly. "Aren't they?"

Cohone stared at him. Slowly his mouth closed and his jaw tightened. The earlier warmth and camaraderie of his greeting was all gone.

"They're warriors," he said grimly. "Plunderers. Fighting and feasting's all they know. And you want me to tell them to get out and sweat behind a plow? You ought to know they're the last to be convinced of that. I have to start with the bottom ranks and work up. You must know the survey!"

"The survey made of this planet," said Harb, quietly, "was set up to chart a course of action for you, not for you to hide behind."

Cohone glared at him plainly, now.

"I'm not hiding behind it—you know that!" he snapped. "But I've been here ten years. You haven't. These people are independents—*in-*

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

dependents, you understand? And independent cultures are like rubber balls, you punch them and they punch back automatically. You can't force them, you've got to convince them! And that's a slow process, maybe taking local generations to change. No one could make that slow process move any faster than I've made it move here; and that's all there is to it. You can't *force* change on independent culture."

"There's more than one kind of force," said Harb, still quietly. He sat back, and let his words sink in. He saw the loosening of Cohone's features into an expression like despair.

"You're recommending my removal then?" said the volunteer, at last, hopelessly. "That's what you're here for?"

"Not at all," said Harb. "I'm here to help you. Come along."

He led the way back out to the transfer boat. From the boat he brought out equipment and dressed himself. When he was done, he stood before Cohone, armed not only with a handgun, but with a Homskarter-style sword and a concave shield having a spike in the center. A backpack, rations belt, and outdoor clothing—from high boots to crash helmet disguised as a Homskarter conical iron helm—completed his outfit.

"But you'll make trouble!" said Cohone almost fiercely when the dressing was completed. "All that stuff's too advanced to use here. It's illegal! When Earth HQ learns about this, they'll convict you—"

"They'll commend me, not convict me," said Harb, dryly. He looked at the other man with what was almost a touch of pity. "Tell me, what did you do before you volunteered?"

"I was a bridge engineer—a managing bridge engineer!" said Cohone. "I've worked with people like these locals on physical jobs all my life—"

"But," said Harb, "you wanted to do something worthwhile, and real. So you signed up and they gave you a three-month course in the basics of xenosociology and the rules in the Handbook; and for the last ten years you've been here trying to make it work the way you were taught."

"What's wrong with that?"

"Nothing," said Harb. "For a volunteer like yourself. But I'm a professional. I have two degrees and one of them is in xenosociology. On top of that, I've had four years of Academy training, and a six-month internship at Earth Headquarters before I was sent out to take a post on a probable world, like this one. It took me less than fourteen months on that world before I was promoted to Sector Chief and transferred to this sector to replace your old chief. Fourteen months—not ten years."

"What of it?"

"What of it?" repeated Harb. "It

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

means that I was successful on my probable world. I got results. And I didn't get them by working the way you've done here. I stuck my neck out to get them, but I got them. And I got patted on the back for them, not court-martialed. Do you know why?"

"No," retorted Cohone, "and if there is a reason, it's got to be a bad one."

"Good or bad depends on your point of view," said Harb. "The higher echelons at Earth Headquarters don't live by your rule book. They can't afford to. Behind that rule book the law is *survival of the fittest.* If you have the brains and the guts to break the rules, but get what's wanted in the process, the fact that you broke the rules is going to be overlooked here, because I intend to get what's wanted."

"And what's that?" Cohone's face was lumpy and savage.

Harb shook his head at him.

"You really don't understand?" he said. "All right, I'll tell you. I've got a dozen worlds in my sector and a dozen people like you on them; but the other eleven are showing worthwhile results. I'm not going to let the record of this one planet pull down my overall achievement report. So, I'm here to help you out. All on my own. You don't have to break a rule or do a thing. I'll do it."

"But what?" demanded Cohone. "What're you going to do?"

"What's necessary. The situation's too static, and you haven't been able to move the locals out of that in ten years. We've got to shake up the status quo here, or this station of yours can sit forever with your medical days and your rice-Christian local converts, and nothing's going to happen. Now—where do you keep your boats?"

He picked up a small, power-unit-operated outboard thruster—absolutely forbidden for culture level such as obtained here.

Grimly silent, Cohone led him down along the pebbled beach to a small floating dock to which were tied a number of the high-sided native boats—*canots*, they had been named in the survey, after the Canadian-French word for canoe.

These were all as narrow as splinters, with tall prows and sterns. Harb picked the one which seemed to have the most beam to it, and stepped carefully down into it. Seating himself, he clipped the outboard motor to its right side near the stern, with the motor's jet down in the water; and cast off.

"I still say—you don't understand!" burst out Cohone suddenly behind him, as he drifted away from the dock. "I've put ten years of my life into this station! You can't do this to it!"

"You can't. But I can," answered Harb half to himself and switched the motor on. The burbling of its jet soon covered the sound of Cohone's now shouting voice, as man, dock and clearing dwindled into

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

the shoreline distance behind the stern of the *canot.*

Harb set a course from point to point of the wavering shoreline, and the little *canot* sliced smoothly, quartering through the rolling waves. The chill lake breeze blew invigoratingly in his face and made him cheerful. Perhaps someday, he thought, he would come back here from Earth to fish for whatever native water-species there were in this lake. In spite of the gray, rolling water, the too-yellow sunlight and the different gray-greens of the tangled forest along the shore, the scene was strongly remindful of those few Canadian northwoods lakes that only existed on rare private estates back on Earth, nowadays . . .

He relaxed into thought, steering the *canot* with an automatic hand on the outboard tiller. Cohone in the flesh luckily had turned out to be exactly as Harb had pictured him. Now, if Harb could only find a comparably useful individual in the Homskarter King Rajn, to whose court and wilderness city, the *canot* was now headed . . .

It should not be difficult. Thank the survey for that. Harb smiled slightly to himself. That was his difference from Cohone. The volunteer had studied the survey with an eye to advantaging the Homskarters. Harb had studied it with an eye to advantaging his job.

He had not, of course, told Cohone that whole truth. He looked down a little complacently now at the hard-muscled legs within the boots stretched out before him in the *canot.* He was young, in top physical shape, and thoroughly armed and prepared to deal with the court of savages he was about to encounter. And that was another difference between him and Cohone. Cohone was trying to deal with a culture. Harb intended to deal with individuals.

. . . With the result that the Homskarters would make the cultural shift that the survey promised—bringing this world to a need for human aid and immigration. And bringing Harb the rewards obtained by one who added a world to the human community.

For World 49381D was in balance now—a balance that would need to be disturbed before any real progress could be made into a civilization that had its fingers stuck in the gears of the inexorably forward-turning wheel of progress toward a modern technological society. The present situation lay in stasis between the forest country people and the people of the plains, on this world's single great continental land-mass, sprawling like a skinny dragon three-quarters of the way around its globe.

The first human assumption had been that the already agricultural communities of the plains, with their primitive kingdoms, should be the one humans might best infect with the concept of progress. But

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

the survey had corrected that assumption.

The plains dwellers, with their crops, their caste system, and their mud-walled cities—their monarchs and merchant class—possessed a culture too fixed and brittle to adapt. The minds of the plains people were closed and they lacked cultural vigor.

No, said the survey, advancement on this particular world could only come from some vigorous, new culture which had no paralyzing old patterns to inhibit it from development. And the survey suggested that—working within the rules—the way to develop such a culture was to bring the hunting tribes and villages of the forests to a self-supporting agriculture. If this could be done, in time it would turn the forest warriors from raiders of the plains into a people concerned with their own land and development.

Freed of the pressure of yearly attack from the forest people, the plains civilization would grow weak and corrupt. Eventually it would either regress, or be swept away by the new civilization building in the woods to the north; and the forest people would begin to lead the long trek upward into a civilization comparable to that of modern humanity. At which point, hopefully, humanity would have acquired a new race of friends and partners. It was a careful plan, and a long one, looking some thousands of years into the planet's future.

Harb was more concerned with a plan that would show results in a matter of months. The basic idea of generating a developing society out of the forest people was sound. The trick of the survey plan, however—as Cohone had found—was to get these forest warriors to consider anything as demeaning as scratching in the dirt. The Homskarters, like all the forest peoples, lived mainly by hunting, but also by what food—primarily grain—they brought from their annual raids on the plains. Particularly, they needed the grain to survive the months of the forest winters.

Each fall the Homskarters, like other forest tribes, gathered and pushed their *canots* through nearly a thousand miles of winding lakes and streams, to emerge with fire and sword upon the crops and walls of the plains' cities; and return with food and plunder to see them through another year in their forest fastnesses.

Sometimes, they were met by the more numerous, but less fierce, troops of the plains kingdoms and driven off. In which case there was starvation and disease among the forest dwellers that winter. More often, they conquered; and came back to spend the wintry months feasting and living high on the storable food, drink and other produce of the plains—eked out by the few primitive patches of root vegetables grown by the women they had left behind them.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

And so the balance was held between plain and forest. It was this balance Harb intended to upset. Not slowly, as recommended by the survey—not in Cohone's way—but suddenly and dramatically. He had spent the best part of the nine months since he had taken over this sector, first studying the worlds under him for one where such a dramatic change could be effected, then studying how the change might be brought about. Cohone, in fact, was not doing that much worse than the men on the other worlds of Harb's sector. But Cohone did have a world with a situation Harb could disrupt to his advantage.

It had taken some months of intensive work with records and computerized game plans, but Harb had eventually come up with what he wanted. Instead of a slow development of the forest people apart from the plains culture, why not make it possible for one of the forest leaders to become a Genghis Khan who could first take over control of all the forest tribes, then sweep down to conquer and occupy the plains?

The result would be a blending of the two cultures, with the forest people as warrior-aristocrats, and the plains people as a sub-caste of servants and slaves. From the brighter individuals of such a subcaste, forbidden the warrior prides and occupations, could come artisans and scholars. And later on, when hybrid vigor began to manifest itself out of the crossbreeding of peoples, there would emerge true geniuses with intelligence and invention. Meanwhile, the quarrelsome warrior-aristocrats would have divided the plains into a number of competing kingdoms, so that individuals of genius could find a number of different havens and a number of different patrons.

All that would be needed to get Harb his next promotion to Division Headquarters would be to show that this development had been fully begun by actions of his. Rajn, the so-called king of Cohone's Homskarters, was a leader of the sort needed, and his second-in-command was, according to Cohone's reports, no threat to such a plan. It needed only be put in Rajn's best interests to cultivate and harvest a surplus of grain—not merely enough for winter survival, but enough more for barter—to start the juggernaut of progress to rolling.

Cohone could not do this, not only because of attitude, but because he had come here with neither the proper plans nor equipment. Harb, on the other hand, had come with all these things. He patted the numerous, well-filled pockets of his jacket.

Half an hour later brought him around a final headland into a wide and sheltered bay filled with *canots* ranging in size up to that of

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

fifty-foot vessels with square sails. A wharf area was built out on pilings some distance from the shore; and behind the wharf on the mounting slopes of a hillside, was the palisade-enclosed cluster of wooden structures that was the "palace" of Rajn, King of the Homskarters, and the surrounding "city" of Homska. Altogether, they probably contained some twenty-five hundred native men, women and children—which made this a forest metropolis.

Yet, thought Harb, steering in toward an inconspicuous corner of the wharf, it would not do to underrate Rajn on account of the small numbers of his people in this one settlement. When fall came, the total raiding force in his flotilla of *canots*, heading plainsward, would draw from the forest tribes of nearly a million square miles of surrounding territory; and his "army" would amount to as much as ten thousand backwoods fighters. Good fighters, every one of them—though, of course, there was no possibility of any one of them being as good as Harb, himself. Not unless there was some individual equivalent of a superman among them.

He moored the *canot* by a wharf, the floor of which was four feet above his head, jumped up, caught hold of the edge of it and swung himself up on to it. In spite of his attempt to come in as unobtrusively as possible, there was a small bunch gathered to examine him, in his boots, helm, shield and weapons.

"Hey, Outlander!" said one of the foremost of these. "What happened to that hoe of yours? Looks like it got itself stuck in a sheath and turned into a sword. Is that really a blade you've got there? Let's see it."

The Homskarter was standing directly in front of Harb. It was a matter of pushing the broad-shouldered, round-faced, hairy native in his cloth-wrapped body and limbs—red-wrapped arms, green-wrapped legs—out of his way, or walking around him. Harb stopped. He had no time to waste fighting with ordinary members of the native populace like this one.

"A sword it is," he answered smoothly in flawless Homskarter, "as you say—that used to be a hoe. I'm taking it up to King Rajn to show it to him. So maybe you'll pardon me, friend, if I don't stop to show it to you first. The king might take it amiss if it was you I stopped to show it to, before him."

Their eyes met. The eyes of the Homskarter, in his round, flat, snub-nosed face, were as gray as cold dishwater. Then the native stepped aside.

"Maybe you're right at that, Outlander," he said. "I wouldn't want to be the one to keep you from King Rajn. But maybe I'll see you again here, on your way home."

"That might be," said Harb, and

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

went on through the city, up to the palace.

He attracted some attention going through the town and more so from the guards at the gate in the palisade surrounding the palace. But these, in spite of showing some amusement, made no attempt to bar his entry, but waved him on in. Harb had carefully studied the plan of the palace, and found his way without difficulty to the entrance of the largest building within the walls—the main hall of the king. He went up half a dozen steps to its wide doorway, passed a couple more guards, who also let him through, and walked into the main room of the hall.

It was a long chamber with tables down both sides at which warriors sat eating and drinking, rather in the manner of a perpetual picnic. At a small table crosswise to the others, and facing the entrance at the far end of the room, sat a heavy, middle-aged Homskarter with several others on either side of him. Even without his pre-study, Harb would have recognized the center man as the most important individual in the room—Rajn, himself.

"Outlander!" shouted the Homskarter king, as Harb came forward between the flanking tables of the room. "What's happened to bring you here, away from your fields and weeding? And where'd you get the war tools?" He slapped the table before him and broke into the heavy coughing that was the equivalent of laughter among his race. "I know—you've had a plague of insects on your crops. And you come to ask my help!"

The whole hall broke out in coughing laughter. The king, Harb saw, was more jovial than drunk, as yet, although it was mid-afternoon, and already the one heavy meal of the day would have been done—clearing the way for serious drinking and other sports such as story-telling, fighting, and brutal—if not lethal—practical jokes played on each other.

Harb continued walking forward until he was only half a dozen feet or so in front of the king's table.

"King," he said, calmly, in his accentless Homskarter, "I'm not surprised at your not recognizing that I'm not the outlander who tills his fields up the lake from here. To you Homskarters, I suppose, we all look alike. My name is not Cohone, like the outlander you know—but Harb. We are different."

King Rajn sobered. He leaned forward on one white cloth-wrapped elbow, and his long, gray-haired hand lay flat on the table in front of him. He looked at Harb with interest.

"Harb . . ." he repeated. It had been a fortunate coincidence that the name was one easy for the Homskarters to pronounce. Cohone was not so. Neither, for that matter, was Harb's last name—Mallard. "Harb . . . It's interesting. I've

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

never seen the Other with weapons. I didn't think you outlanders possessed them."

"Some of us do," said Harb, idly. "But if my weapons offend you, I'll gladly leave them outside this hall. Because I've come to ask a favor of you. I'd like, King Rajn, to go with you and your men on your raid this fall into the plains, in order to see for myself how the Homskarters handle such things. There's too little fighting to be had nowadays on our outlander worlds."

"I believe that, after seeing your fellow scratching like a woman in the dirt, up-lake," said Rajn. "But you aren't seriously claiming to be a fighter?"

"Some people might call me that," said Harb, mildly. "But if I might add to the favor I'm asking you, O King, I'd particularly appreciate it if you'd also extend me your royal protection while I'm with you. Just so none of your men'll challenge me to use these weapons of mine."

"Now, that's a strange request," broke out the Homskarter sitting next to the king. Like Rajn, he wore the royal cloth of white–on one arm only, instead of both arms, body and legs. Harb identified him as Witta, Rajn's cousin and second-in-command, by vote of the Homskarter chieftains. He could not be sitting at the royal table unless he was blood-kin to the king–and only a close relative or full brother to Rajn would have dared to speak up unbidden like this. But a full brother would have had the right to wear two limbs white-wrapped instead of only one, as Rajn himself wore white on all four.

"Strange, indeed," said Rajn. "You want to come along with us to see fighting, but you ask me to protect you from any fighting with men of mine. Are you that afraid of the Homskarters, that you have to have my shield raised over you? If so, why should I take such a coward on my raid into the plains?"

"Why," answered Harb, mildly, "I don't think I'm any more afraid of your Homskarters than anyone else might be, whether he's a Homskarter himself or an outlander like me. It's true your warriors are all hard fighters; and I don't doubt there are some fearsome men among them. But it wasn't from fear, exactly, that I asked your protection. It's just because I'm a poet and a story-teller. And you ought to know that making proper poems and stories takes all of a man's attention–which can't be had if he's disturbed all the time by the exciting prospect of letting someone's blood."

For a moment the hall was silent. Then Rajn burst out into his coughing laughter, and the whole room resounded with it once more.

"By my sword!" Rajn shouted. "I've heard a lot of excuses for not fighting in my time, but I never

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

"We now have all the materials and technology required to live in space,"

says nuclear physicist EDWARD GILFILLAN, Jr. In his book *Migration to the Stars* he explains why mankind will outgrow the earth and describes how we will overcome the problems of life in outer space. He answers in detail questions about food and water, power, breathable air, production, transport, recycling waste, jobs, recreation, birth and death, evolution. His book may read like science fiction but it is all science *fact.*

MIGRATION TO THE STARS:
Never Again Enough People —$8.95.

A ROBERT B. LUCE BOOK • Distributed by David McKay Co., 750 Third Ave., NYC 10017

heard an excuse like that! Poet and Outlander, you've got my protection! *Provided* you can make a poem or a story as well as you seem to think you can!"

"King!" shouted a voice from one of the long tables behind Harb. "Let me fight the outlander once first! After that, he can spend all his time making stories if he likes! A favor, King—a favor to match the outlander's favor! Let's see how he used his weapons once, first."

"What if he went back to his own place and told how he was so clever he won a king's protection without ever proving himself?" interposed Witta.

Rajn's alien laughter slowed and stopped. He sat thinking for a while and Harb waited. Finally he nodded.

"Now, there's some sense in that, cousin," he said, and looked up at Harb. "Outlander, my protection's no light thing. You've got to prove yourself once anyway, to gain it. It's my decree you fight the man who just cried out for the right to fight you."

Harb shrugged.

"If it has to be that way, O King," he said. "Though I'd hoped not to have to reduce your following by even one worthy Homskarter warrior. But, as you say—"

He whirled. His ears had warned him just in time of the rustle of footfalls among the soft carpet of

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

trash and bones on the floor behind him. He was able to swing about and get his shield up just in time to ward off the down-swing of a sword in the hand of a broad-shouldered Homskarter, who had crept up behind him.

Even prepared as he was with his special shield and other equipment, and trained by months of practice, Harb had not adequately anticipated the impact of that sword-blow, delivered with all the native's strength. Literally, it drove Harb to his knees; and his shield-holding arm felt as if it had been broken. If he had been fighting with weapons actually equal to the Homskarters', the fight would have ended within seconds after that.

But the warrior's sword glanced off the metal studs set around the rim of Harb's apparently wooden shield. The blade glanced downward, bit against the metal spike protruding from the center of Harb's shield, and broke off short—as is likely to happen when brittle primitive iron comes hard enough against a sophisticated steel alloy. The Homskarter warrior paused to stare at his sword in amazement; and in that moment, Harb was able to regain both his senses and his feet. By the time someone at the nearby table had tossed the warrior another sword, Harb was ready for him.

He swung his own sword at the warrior's legs and the Homskarter dropped his shield to catch the blow. For a moment the upper part of his body was exposed and Harb, sighting through an apparently accidental notch in the top of his own shield, pressed a metal stud holding the handgrip of his own shield.

In the dimness of the hall, there were no eyes quick enough to see the tiny, dark metal sliver that flicked from the tiny hole in the point of Harb's shield-spike, to penetrate the heavy leather strips wrapping the upper chest of the warrior . . . With a shout, Harb charged into his opponent, clashing shield against shield.

The other reeled backward. Harb's sudden attack, their coming together, and the involuntary step backward the other was forced to take, all masked a sudden faltering of the native's sword arm, as the potent tranquilizer contained in the metal sliver began to act.

The Homskarter stumbled and sat down. Harb hewed downward with his sword at the unshielded head and the razor ceramet edge of his steel-alloy blade sliced easily through the native iron of the helm of the other, hewing through skull and neck deep into the warrior's body.

A shout of amazement went up from the watchers at the tables in the room. Harb was forced to stand on the body to draw his sword out again. He wiped it, a little dramatically, on an edge of the dead Homskarter kilt.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

"That was a powerful blow, Outlander," said the king, as Harb turned once more to face him. "Come and sit down here near the end of the long table on my right. If you can tell stories as well as you can fight, you are worthy of my protection, all right."

"I thank you, King," said Harb, moving over and taking the seat made for him on the long bench behind the table. "But I'd appreciate your excusing me from any story-telling, right now. As I said, the excitement of blood-letting's set my own blood buzzing in my head, and I can't properly remember the stories I'd like to tell you." He looked about the table. "Besides, even though I'm not hungry, the exercise—" he glanced at the dead body of his late opponent, now being dragged out of the hall by its heels, "has given me a thirst powerful enough to tell my grandchildren about."

The king coughed again with laughter, thumped the table, and shouted to the servants.

"Drink!" he roared. "Drink, for the fighting outlander!"

A servant brought Harb a deep wooden bowl, filled with something over a quart of the flat, brown, ill-smelling liquid that was the local fermented grain beverage. Harb palmed into his mouth a tiny yellow pill which instantly overwhelmed his taste buds with a lemony flavor and poured half the bowl down his throat at once without either tasting or smelling what he swallowed. As the king coughed his approval, Harb emptied the bowl with another long series of swallows—and, as if this had signaled it, the day's serious drinking began.

It was obvious, before long, that the aim and interest of the Homskarters, including those at the king's table, was to see how much native beer this outlander could hold before the actually rather weak alcoholic content of it could put him under the table. He pretended to be unaware of their design, however, and drank on, parrying questions about himself and the type of outland he came from, in its difference from Cohone's, with the answer that he would tell them all at some future date when he had recovered from the excitement of his earlier duel.

In his turn, he studied those who drank at the king's table. There seemed to be a number of relatives besides Witta, including one brother barely old enough to bear weapons and too young to be a serious claimant to rule the Homskarters. Clearly Witta was undisputed second-in-command. But Harb noted with interest that, outside of the authority he bore, Witta seemed to show little talent for the position he held.

He was obviously a plain, dull, physically-minded warrior—probably of unusual strength, to judge by the width of his shoulders and

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

the bulk of his body above the table. But though he showed none of the shrewd, if primitive, wit exhibited by the others at the royal table, all of the others, including the king himself, seemed to avoid making him the direct butt of any of their jokes and general horseplay.

Harb smiled to himself. The kingship among the Homskarters, his research had informed him, was theoretically hereditary—needing only to be ratified by a council of the chieftains. In practice, however, the survey had noted, inept heirs-apparent to the throne had a habit of dying off, or rejecting the crown, until the succession lighted on the most able of the royal family then of warrior age and capacity.

Thus in practice the king was actually chosen by the chieftains. So, also, was the second-in-command as the man next-best able to rule, although theoretically he should also be a member of the royal family. It would not be unusual under such conditions, however, noted the survey, for an unusually able claimant to the throne not only to get himself chosen king, but to control the choice of second. So that the second should not pose the threat of usurpation that might well arise if the next-ablest man of the kingdom was continually sharing roof and board with the king himself.

Clearly, Rajn had chosen as harmless a second as he could. But, just as clearly, having chosen someone harmless, it was necessary to keep up appearances for the second-in-command. So, it was probably by will of the king that no one baited or teased Witta into any action that might betray the essential lack of personal authority and leadership.

Meanwhile, the drinking was beginning to tell on the rest of the Homskarters in the hall. One by one, they were succumbing to the native beer; they had compensated for its weakness by drinking tremendous amounts. Harb, although he was not in the least drunk, had filled and emptied himself half a dozen times over in order to keep up with them and show a proper capacity.

The only other individual in the hall not drunk, at least to a state of near-torpor, was the king. And this was another puzzle for Harb, since he had watched the king's bowl being refilled at least as often as his own. It was the same size bowl as everyone else had, though more ornately carved, and it was hard to see how the king had stood up to the amounts he must have swallowed from it.

Yet . . . there are limits to any animal capacity, human or alien, and there came a time when even the king, who had been blinking sleepily in Harb's direction for some time, dropped his head on his pillowing arms and did not stir again.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Harb looked around him. As far as he could see, the hall was filled with unconscious warriors. Slowly, he got to his feet and picked his way up to the royal table. The king's drinking bowl was sitting, half-empty, by his elbow. Curious, Harb picked it up, dumped out the liquid still in it, and felt inside it.

Sure enough, though it took a bit of fingering to make sure of it, the bowl had a curving false bottom, clever enough to trick the eye alone, even close up, but high enough in the bowl so that it held no more than half what other drinking containers held.

Harb nodded and set the bowl back down by the king's elbow. He went past the table back into the interior of the palace.

The layout inside was simple. Behind the royal tables were entrances to a huge kitchen, and what must be at least as large, if not larger, female quarters. The only other doorway opened on a flight of steep, circular stairs; and, climbing these, Harb at last came out on the top platform of the palace tower. He found himself on a circle perhaps twenty feet in diameter, with a breast-high wall, pierced with apertures, running all around it.

Harb walked over to the wall and leaned on it, breathing deep of the cold night air. Above, the stars twinkled. Below, the town was a dark splotch between the hillside and the lake—which was just now beginning to silver farther out, with the moon rising over the hill behind the town.

"What do you see, Outlander?"

Harb whirled around. The voice had come from behind him, from the direction of the stairway. It had been thick, but thoroughly understandable; and as he turned, he saw the king walking slightly unsteadily but purposefully toward him. Immediately, Harb tensed. But then he saw that Rajn was unarmed, while Harb himself still had his sword at his belt—to say nothing of a dagger and several other, more inconspicuous and powerful modern weapons in his jacket pockets. Harb made himself relax. He leaned back once more with an elbow on the wall behind him.

"Nothing much, O King," he said. "Just the moonlight, the lake and your town."

"*My* town—yes." Rajn came unsteadily to the wall, leaned on it and turned toward Harb, bringing his dish-shaped face into the moonlight. The skin above his nose was deeply wrinkled in the native equivalent of a smile. "You hold your drink well, Outlander."

"Some might say so," answered Harb. The truth of the matter was, in fact, that he had not held it at all. Before coming to this world he had ingested a fungus-like strain of stomach bacteria that converted any alcohol he swallowed almost immediately to sugar. That particu-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

lar digestive conversion, in fact, had been as nothing compared to the extended series of hypo-immunization shots he had taken in order to make it safe for him to ingest the native foods at all without massive and immediate allergic reactions.

"You're no small drinker yourself, King Rajn," Harb added.

"I've got a magic bowl," said the king, and coughed a short, drunken cough of laughter. "As perhaps you noticed, when you picked it up just now in the hall." He stared in the moonlight into Harb's face. "What brings you here, Outlander?"

"I told you, King."

"And I told you I had a magic bowl," replied Rajn, thickly. "No, Outlander, you're a warrior and a drinker, such as I've never seen; but you're here for some purpose you aren't telling me. And I don't intend you to leave until you do—" he broke off and coughed, as Harb stiffened instinctively. "You've got your sword, Outlander; and I've got nothing. Were you thinking of cutting my throat and getting away in the night? But the guards on the main door and the gate aren't drunk *or* asleep; and some hours back I sent word they weren't to let you out."

He peered at Harb.

"So, do you want to tell me now?" asked Rajn. "Or some time in the future—why you're here?"

"All right, King," said Harb. "As you see, I'm an outlander. Like the other outlander you know, I want to get your people started growing grain."

Rajn coughed, and the effort made him stagger.

"You've got a good feel for a joke, Outlander," he said, straightening precariously, and turning toward the stair. "We'll talk about this more tomorrow, you and I. Or the day after tomorrow . . . or the next . . ."

He reached the head of the stairs and Harb heard him stumbling down out of sight. But the king stumbled carefully, evidently, or else with the benefit of long practice on those stairs, for there was no sound of falling.

The next day, he put on a casual demonstration of how a wooden shield could be split and broken by a karate hand-blow. That evening, reciting a translation murmured into his ear by a small unit hidden there and in radio contact with a recorder computer in his right upper jacket pocket, he gave the assembled hall a poetic translation of the legend of Beowulf.

The success was gratifying. For the first time, the Homskarter warriors began to gather around him and in the next few days that followed, he gradually became a celebrity second only to the king and Witta.

Meanwhile, Harb was observing these two royal individuals closely. The more he saw of Rajn, the more convinced he became that

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

this was someone who in native intelligence and basic open-mindedness was far above the rest of his tribe. In contrast, the more he saw of Witta, the more Witta seemed to stand out as all that was representative of the brainless adherence to habit and custom among the Homskarters. If a contest had been held to choose a typical Homskarter, in terms of sword arm, physical appetite and refusal to consider anything outside the accepted pattern, Witta would have taken the prize.

Harb silently congratulated Rajn on picking such a second. If there was such a thing as respectability among the Homskarters, Witta's endorsement of anything put the stamp of respectability upon it. A king who was more unorthodox in thought and action than most of his people needed someone like Witta around to assure the common herd that everything the king did was just as it should be.

With Witta himself, Harb made little headway. There was nothing particular about Harb to which Witta could object except that he was different. But that was enough. Harb's one or two attempts to scrape an acquaintance with the second-in-command were rejected by Witta, with dark suspicion.

Meanwhile, however, a wordless communication had been set up between Rajn and Harb. Both were clever individuals, and they began to draw closer to each other as the date of departure for the summer raiding approached. The night before leaving, they spoke frankly to each other once again. And on this occasion, too, the king chose the privacy of the tower for their conversation, just at twilight.

"Outlander," said Rajn. "The time has come for a meeting of minds between us. You have come here to trade for something—I smell the bargaining on your very breath. Now, the last time we spoke, you still insisted that what you want is for my warriors to give up the sword-trail and grow grain through the summer months. This is it, truly, what you have come for?"

"Not give up the sword-trail, exactly, King," said Harb. "But the grain can make you a mighty race."

Rajn came close to him and his dish-shaped face looked grimly into Harb's. This time the king had come to the tower armed, and Harb became suddenly conscious that the small of his own back was pressing against the edge of the wall around the tower platform. As close as they were now, modernity of weapons was not the advantage it might have been otherwise. One shove from the king's powerful arms could tip Harb over backward to fall forty feet to the stones of the courtyard below.

"Farmer-work make a mighty race?" Rajn snorted.

Harb gazed steadily into the gray eyes.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

"King," he said slowly. "Take my sword and try it on something." Slowly, to take any appearance of threat from the action, Harb drew his sword and handed it over, hilt foremost.

The king grasped the hilt, stepped back, and looked around. He took off his own helm, set it on a stack of stones piled up ready to be heaved down on the head of possible attackers of the tower, and lifted up Harb's sword.

He brought it down in a whistling cut. It clanged loudly, splitting the helm in two and cracking apart the rock just beneath. Rajn lifted up the sword and gazed at it in the last rays of the alien sun.

"Ah," he said softly, as if to himself, "a magic sword to match my bowl."

He did not offer to return the weapon.

"No, King," said Harb, almost as softly, "a magic hand. It has been said that whoever holds that blade shall have a magic hand for combat—provided only that the previous owner has worked certain necessary spells in making a free gift of the blade to the present owner. Otherwise a magic fire will slowly begin to consume the unprivileged hand that held the sword, until after some days there is nothing but a blackened stump."

Rajn stood quite still. Harb, watching closely, saw the king's hand loosen slightly on the hilt. This was not exactly surprising, for Harb had thumbed a small pressure point on the hilt in passing it over, and now a power-source linked to a strip of metal underneath the surface material of the hilt was slowly beginning to warm toward a temperature that would eventually make the hilt too hot to handle.

Absently, almost indifferently, after a moment, Rajn passed the sword back to Harb.

"Perhaps, before too long," he said, "you may be moved to make a proper gift of that weapon to me, Outlander. It would be a gift to bind the friendship between us."

"Assuredly, King," said Harb. "As soon as we have passed through the present spring and summer into next winter when the weather shall be cold enough to make safe the working of the proper gift-giving spells. I take it, then, you'll be willing to let me accompany you to the plains after all—as a story-teller, of course, privileged to be free of such things as wielding a paddle or other duties which might interfere with my art as a story-teller."

"You will be welcome," said Rajn, almost dreamily. "But I wonder what benefits there are in your coming with us?"

"For King Rajn," said Harb, "there is, of course, the fact that I may soothe your cares by the occasional private telling of stories. Stories which may sometimes have knowledge in them you might find

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

useful at the moment, in war and on the sword-trail."

Rajn looked at him with narrowed eyes.

"The outlander would give me advice?" he said. "And what benefit is there in that for the outlander."

"The excitement of the sword-trail," said Harb, smoothly. "And of course, there is the matter that if Rajn becomes great in war and a great king, it is to my credit; both here and in that far-off place from where I come."

He hesitated slightly before adding a few more words. Ordinarily Rajn was too shrewd an individual to be taken in by flattery. But this was not so much flattery as a truth both recognized.

"It is my feeling that a king like Rajn is rare among rulers," he said. "And much may be done by him impossible to lesser men. I would be close to such a king."

Rajn coughed with humor.

"And it comes to *me* that if nothing else, you might sing me to sleep nights along the sword-trail, Outlander, with such pretty words." He turned away, adding over his shoulder, "You may come."

So the annual foray to the plains commenced. The thousand-mile trip to the lower edge of the forest country was a wild and thrilling adventure even to Harb, who came from worlds that knew star travel. The forest warriors moved in a pack of high-sided, high-ended, fifty-foot-long cargo *canots*, by lake and river and over forest portages between these waterways, picking up more *canots* and adventurers from other settlements that they passed. By the time they paddled forth onto the now-wide river that had carried them out of the last of the shadows of the forest country into an open land of grassy meadows and rude, small farms, there were nearly eight thousand of the raiders.

Now they were approaching the arena of probable conquests. For some time the land had been flattening out around them. The rolling hills that had flanked them during the first few days after they emerged from the forest, had begun to recede toward the horizon some time since; and now they looked out on flat territory stretching back from either bank of the river. It was territory mostly divided into farms or grazing areas, and with only an occasional clump of trees to break the monotony of level ground. Both land and air were drying and the temperatures were warmer. The forest tribesmen threw off whatever they wore by way of clothing and went naked except for a minimum harness to which were slung their weapons and their most valuable smaller possessions. They sweated freely in the lowland heat and stank mightily.—And grumbled.

"How long, King?" A daring, if anonymous, voice called from one

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

of the neighboring *canots*, one hot morning.

Rajn, who headed them all in authority over the chiefs and lords of the lesser forest tribes who had joined them along the way, pretended not to hear. The common warriors were growing impatient. Already they had passed by several of what could only be described as semi-prosperous villages, secured by palisades of vertical sharpened logs at least double the height of a warrior.

It was always a fine art for a leader like Rajn to know how long he could hold his raiders in check. Let them loose on upstream villages like these too early and casualties would diminish his forces for the richer targets farther downstream. Hold them in too long, and he could well have a mutiny on his hands and find both himself and his villagers slaughtered by those anxious to appoint a more aggressive warlord. Harb worried a little about Rajn holding back too long. If the mass of the raiders turned on the Homskarter king and his villagers, they would turn on the outlander who was of their party. And with all the sophistication of his secret weapons, not even he could deal with several hundred bloodhungry native fighting men all at once.

Rajn, however, was apparently reading signs in the behavior of his own people that Harb was not knowledgeable enough to perceive. Without warning, Rajn called his stentor. "Pass the word," he said. "We attack the next village."

The stentor, a villager chosen for his powerful voice, shouted the decision to the immediately following *canots;* from where it was relayed to those further back. A roar of approval followed in its passage.

The *canots* erupted with a bustle of preparation. Bladed weapons were resharpened, and all other panoply of battle reoiled, restrung, or refurbished.

There was a whoop from the first *canot.* A new village had been sighted. The *canots* moved downriver steadily for it.

As they got closer, it seemed to Harb that some sense—and it might almost be the defenders' sense of smell—had warned them of what was coming toward them. As the *canots* approached the riverbank below the village, above the standing logs of the palisade, headgear and faces were thickly visible and busily in movement. Rajn stood in the prow of the foremost *canot,* talking loudly about the wealthiness of the particular village they were approaching, although Harb could see no significant differences between it and the villages they had bypassed up until now.

The *canots* rushed toward the bank, the warriors in them unusually silent. Then, Rajn's leading *canot* drove its prow aground and those within it came boiling over the end of it. Leaping down to the

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

muddy earth beneath they burst into a roar, which was echoed and amplified as other *canots* drove aground on either side of it and their occupants leaped to the land. Yelling, the forest warriors ran toward the village.

For a few literally frightening moments Harb, who had leaped unthinkingly with the others, thought that the rest of the raiders would carry him along in the press of their bodies into an assault upon the walls then and there—and it had not been his plan to get personally deep into any battle. However, just outside effective bow range from the wall facing them, the attackers slowed abruptly and came to a halt, falling silent again as they did so.

Now it was the villagers' turn to shout. A roar went up from behind the walls, as if the halting of the attack had been a victory won by the defenders. Weapons were shaken in the air above the palisade. When this at last died away, it was succeeded by a steady scattering of yells from both sides; and an intermittent exchange of stones and arrows began between attackers and defenders, none of which did any particular damage.

The forest warriors milled about, not so much arguing with each other now as muttering to themselves, making grim motions at empty air and toward the enemy, and generally psyching themselves up.

Rajn had evidently been waiting for this particular moment. To the surprise and pleasure of Harb, who had been worrying that he might have badly overrated the Homskarter king, Rajn climbed up on a barrel-like container of drink and began to make a speech, calling the rest cowards in every fashion his language could provide, and lashing them with the extremes of insult and contempt.

The forest warriors gathered thickly about Rajn. They yelled back at him, waving weapons threateningly at first. But then, gradually, they fell silent. Ominously silent, thought Harb, who had prudently slipped back to the outskirts of the crowd. But Rajn continued to speak, still insulting the rest, but now mixing his epithets with references to the basic strength and fierceness of those he spoke to, subtly flattering them. They responded approvingly to this, and he slipped gradually into accusations and slanders against their opponents in the village. He worked them up to a wild roar of agreement; and he leaped from his platform, calling on all who were not the worst of cowards to follow him, and headed toward the gate.

The whole crowd streamed after him. He was a good ten yards in front of the rest as they crossed the midpoint of the distance between their camp and the palisade; but by the time they were almost to the

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

wall he had allowed others to catch up and even to get somewhat ahead of him. Though he was not among the first to lift the scaling logs and climb them to the top of the wall, he was right behind those who were first.

The forest warriors did not yell, now. They saved their breath for fighting, ignored their companions who fell beside them under the hail of arrows and stones and swarmed up the scaling logs to the top of the wall. Soon there were a handful of them over the points of the logs and fighting toe to toe with villagers on the walkway just inside the top of the palisade.

All the while more of their companions were scrambling over the points of the logs to join them. Suddenly, the heavy gates in the palisade sagged open, whether broken through or unbarred from within by raiders who had gained the ground inside the village, Harb could not tell from his safe point in the rear of the attackers. Forest warriors shouted in exultation, streaming through the opening—and suddenly it was no longer a battle. The fighters around Harb were struggling now only to get into the village before those ahead of them had all the fun of slaughtering the defenceless and robbing the wealthy.

Harb let them go. No one on either side was paying any attention to him now; and it occurred to him sensibly that the forest warriors, drunk with victory, might well prove as dangerous to him inside the village walls as the original inhabitants might once have. He waited until the noise from inside the village had largely died down before taking a walk through the half-open gates.

There was not a great deal to see. The murder was just about over, but rape and a certain amount of amateur torture was still underway, the latter aimed at making sure that none of the villagers got away with keeping hidden possessions of value for wives or children sent off to safety before the raiders landed.

Harb was not the sort of man to be moved in any large, emotional way by the scenes in the village; but on the other hand they were hardly much in the way of entertainment. He turned about and went back out to the raiders' camp. There a victory party was already underway among those fortunate enough to have found loot and returned with it. These were scarcely better company than their companions still in the village. Harb decided to retreat to one of the ships, making himself a warm bed of furs and settling down for the night. The noise on shore kept him awake for a while; then he fell into a sound slumber, rousing only briefly to find light dancing on the inner ribs of the *canot* and discover that, by accident or design, the village was afire.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

In the morning the only visible villagers were dead and most of the raiders were in a sour mood, inclined to grumble about their hangovers and the untrustworthy honesty of their fellows. The village was a blackened jumble of unidentifiable rubble. By mid-morning, however, the *canots* were reloaded and stood off once more downstream.

They sailed past another two villages before Rajn judged it time to send the warriors once more after conquest and loot. Of the next five villages, they struck and conquered three, and soon they were attacking almost every village they passed.

They were into more southerly country now, where the spring was far advanced and the lands bordering the riverbanks were thickly settled. Now the raiders began making marches inland after looting the riverside villages, finding more remote little towns that were less well fortified and raiding these as well.

They brought their booty back on captured wagons pulled by the native draft animals, which looked something like zebras. In the process, Harb noticed that they gave a wide berth to the much larger population centers—small cities, with earth or stone walls up to thirty feet in height and obviously as much more able to defend themselves as they were much richer than the villages.

Harb smiled to himself. He and his equipment had, in assessing the situation here on 49381D, estimated with a high order of probability that the raiders would behave in just this manner. They had not come all this way into the plains to get themselves killed, even though it was obvious that pickings in such a city would be beyond comparison with the proceeds they could glean from the small villages they usually attacked. Harb chose a good hour of the evening when the sun was down and Rajn, at least, was not yet too drunk; and sought out the Homskarter ruler.

"King," Harb said, "it comes to my mind that with all your cares and duties you might be having some little trouble sleeping these nights. If you would care for a tale or two from me to soothe your weariness—a tale told privately, that is—it would be my honor to serve you."

"Well now, Outlander," said Rajn. He had been sitting before a fire, drinking with Witta and four of the lesser chiefs and his eyes glittered slightly as he looked up at the standing form of Harb. "It's strange you should mention that. It's true I've not had as much chance for sleeping as usual; and I owe it to the valuable warriors of our *canots* to keep myself in top fighting trim as an example to all. Suppose we take a skinful of this lowland drink back to my *canot* and you spin a tale or two there."

"Ho, Rajn!" said one of the lesser chiefs, who wore white wrap-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

pings on two of his arms and one leg. "Are the rest of us to miss out on these tales? A little fun might be good for all us leaders."

"Indeed—" Witta began sharply; then became silent as Rajn turned to look at him.

"But what if the tale-telling should make me wakeful instead?" said Rajn cheerfully, looking back at the chief who had spoken. "Brother swordsmen, let me try the outlander's yarning on myself first before I inflict it on the rest of you."

He got to his feet as he said the last few words.

"Come, Outlander," he added, and walked out of the firelight into the darkness before further argument could develop. Harb lost no time in following.

"Well," said Rajn, once he was settled on a pile of furs in the beached *canot*, with Harb seated opposite, "what tale had you in mind to tell me, Outlander?"

"Well, I've been thinking of a story about a king on the sword-trail who gave up the taking of small villages and instead took a walled city such as we passed earlier today on our way back to the river," answered Harb. "This city turned out to be so rich that the warriors he led had more wealth and grain than they could carry; and were able to go home early and spend the rest of the summer feasting and hunting."

Rajn spread the corners of his mouth in his race's equivalent of a yawn.

"I don't know that I care for impossible tales, Outlander," he said. "I like better those stories which could actually be."

"With eight thousand warriors," said Harb, "what is even a walled city?"

"Expensive, Outlander." Rajn's eyes glittered once more in the distant firelight coming over the side of the *canot*. "Far too expensive. What use the riches of a city, if only a handful are left to carry them home, and next summer only a slightly larger handful are waiting to take the sword-trail again?"

"But, King," said Harb, "in this story of mine, far more than a handful are left. Indeed, most of the warriors who attack live to return home rich."

"Ho? And how?" said Rajn.

"For that," said Harb, "I must tell you the tale. It seems this particular king had a friend on the sword-trail with him, an outlander of great strength, who could climb thirty feet of sheer stone wall with his fingernails and toenails . . ."

Harb proceeded to spin a yarn about a superman who could climb walls at night, silently, slay thirty city guardsmen without allowing any alarm to be given, and single-handedly open city gates so heavy that they normally required a pair of draft animals apiece to swing them apart, even after the massive

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

bar that locked them had been lifted.

There was a long moment of silence from Rajn after Harb had ended. Finally, he spoke.

"Would that such children's stories were possible," Rajn said. "But no king would risk his raiders on the chance of such an outlander being successful in such an attempt." He coughed laughter. "But do not think yourself unappreciated, Outlander. You have indeed made me sleepy."

"Risk?" said Harb. "What risk, King? If a king should march his warriors past such a city—again, just such a city as we saw earlier today in returning to our boats—on their way to take some other small village beyond such a city; and if it should happen that the warriors from the forest should camp overnight near the city, surely those within the city would not venture out?"

"Certainly they would not," said Rajn.

"Then," said Harb, "if in the middle of the night an outlander should come quietly to a king and tell him that the city gates were now open—or, better yet, a king should be in such position to see such gates open and rouse his men—what risk then?"

There was another long silence from Rajn.

"Now, that is indeed a thought," he said, at last. "I will sleep on your tale, Outlander."

Satisfied, Harb left him. The next morning, at Rajn's orders, the raiders marched inland again to raid a village beyond the city.

That night found the raiders camped within half a mile of the city; and as soon as the dark was full, Harb slipped away from the others.

He crossed the open country between the camp and the city silently and without difficulty. Halting in the deep shadow at the bottom of the wall to the right of the city gates, he took off his shield.

He had brought sword and shield, not only because it would have seemed very strange indeed to any native to see him adventuring without it, but for more personally important reasons. Beneath its wooden covering, the incredibly tough alloy of which the shield was constructed was honeycombed with small compartments. Harb opened one of these now and took out a small, pistol-like device.

Balancing it in one hand, he touched another trigger point on his helmet that slipped heat-sensing night-glasses down over his eyes. Looking along the top of the wall on either side of the gate with them, he picked out on each side the auras of three warm and living bodies, creating slight clouds above the stone.

He moved away from the gate down the wall to his right until he was a safe distance from the auras, then stopped and fired the pistol-like device upward. A tiny projec-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

tile pulling a wire behind it leaped from the gun-muzzle to the top of the wall, and buried itself deep in the stone there. The impact made only the faintest of sounds. Harb grasped the wire where it emerged from the pistol muzzle and hooked it back through a small wheel-point in the middle of the device. Then, taking hold with each hand on a half of the pistol-shape, he prepared to go up the wall—his shield hung at his back and the scabbard of his sword tied to his left leg.

But he hesitated. Abruptly, he became aware that his heart was pounding fast within him—so fast and hard he could feel it thudding heavily inside his chest wall. It was true enough that he was carrying sophisticated equipment that should make the execution of what he had set out to do a sort of child's play.

But what if something went wrong? What if something unexpected should crop up, something outside his planning?

He hesitated. It was still possible for him to turn around and go back to the camp. Rajn would laugh at him secretly when morning came without anything happening. But the king was too shrewd to do more than that, or in any way risk losing Harb, as long as there were things yet to be discovered or gained from the outlander. And given time perhaps Harb could come up with another, personally safer, way to insure that the raiders took a city like this.

But the moment of doubt and queasiness passed. Harb braced himself, pressed a button on the wire-gun, and a tiny but powerful winch inside it began to reel back into the muzzle the wire it had spat out, lifting gun and Harb to the missile-head buried in the stone at the top of the wall.

Harb reached the top, clung with one hand to the wire-pistol while he got a grip with the other on the stone edge, then climbed up over the parapet and down on to the sentry walkway behind it. He crouched there.

Ahead, his heat-sensing glasses now picked out sharply the heat images of the three sentries on this side of the gate. Predictably, and undoubtedly against orders, they were all clustered near the gate-end of the walkway, talking to each other.

They were about seventy feet from Harb, but with the heat-sensing glasses to guide his aim, this distance was no problem. He detached the wire-end from its half-buried missile, put that device away and took from his shield a small handgun. He sighted it, and fired. Tiny, rocket-shaped projectiles leaped silently from its muzzle to bury themselves deep in the bodies of the three sentries. The three heat-auras slumped one by one to the walkway and lay unmoving.

Harb walked up to the sentries and found them all dead. He cut

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

their throats for appearances' sake and then turned his attention to the ground within the gate.

Down there his glasses showed some twelve more auras. Silently, one by one, he shot these also, and saw them slump to the ground. Then he went softly to the stone stairs leading up to the walkway on the far side. Here also, the unsuspecting sentries were clumped together talking. He fired, saw them drop, and climbed the stairs to cut their throats. Then he went back down to the ground level, and gave visible death wounds to all the sentries he had slain there. Finally he turned his attention to the gate.

Within minutes, he had used the wire-gun to cut through the massive wooden bar, and then winch open the heavy gate. As soon as the aperture was big enough to let Harb's body through, he squeezed through into the open air beyond, feeling a vast relief.

"Ho! Who're you? What're you doing—"

The voice exploded behind him. He turned to see an armed figure squeezing through the crack in the gates, behind him.

There was no time to think. He had been spotted, and the alarm would now be raised. It had all been for nothing unless he could get Rajn back here before the city people found some way of rebarring the gate. Harb turned and ran, cursing his fate. The half-mile to the camp was no short run to make, loaded as he was with shield and sword.

The shield, at least, could be picked up later. He threw it away. And then, just as that moment he heard the thud of running feet, not from behind but ahead of him. Fear took him by the throat. There must have been sentries outside the village walls as well as inside. Now he was trapped between the outside sentries and the individual behind who had surprised him; and he had nothing left but his sword. It was a vastly superior sword to any his opponents would by carrying, but the really effective weapons he possessed were all in the shield, lost somewhere in darkness behind him.

A clamp seemed to close on his throat. Panting, he stopped and yanked out his sword.

Without warning the running feet before him were upon him. Their bodies surrounded him—and he almost sobbed with relief. Even in this semi-darkness he recognized Rajn and a body of the forest warriors.

They rushed past him toward the opening in the gate, all but Rajn, who stopped briefly to peer into his face in the dimness.

"Did you think I wouldn't follow you closely this night, Outlander?" said Rajn. He coughed his humor and went off at a run after his warriors, who were already pushing through the partially open gate.

Harb turned back hastily to hunt

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

for his shield and located it just as the light thunder of a much greater number of running feet struck his ear. Rajn must already have sent a runner back to rouse the camp. Yells and sounds of fighting were already beginning to come from within the gates, and as Harb looked, the gate-half he had pulled ajar with the wire-gun swayed and squealed further open to make a gap half-a-dozen men could enter abreast.

Prudently, Harb ran to one side and watched the dark, heavy mass of the raiders—beginning to shout and howl now that there was no more reason for silence—pour past him into the city. An unbroken river of fighters was coming from the camp. No doubt in another half-hour every forest warrior would be within the city. Harb took himself apart to wait for dawn and what it might show.

What it showed was a captured city completely in the hands of forest warriors, except for a single large building in the center of the city that seemed to be a sort of meeting-house or town hall. This building was apparently crammed with several hundred of the city inhabitants; and these were alive when the rest of the original populace lay dead only because the forest warriors had literally grown weary of killing.

Harb went in search of Rajn. He found the Homskarter king making a drunken party with Witta and the other lesser chiefs; all apparently asleep or unconscious in a shop on the same square that held the large building enclosing the remaining living city people. For a moment, Harb thought that Rajn had passed out with the rest; but as he came close the king opened his eyes and looked at Harb with a gaze that did not show drunkenness at all.

"Outlander . . ." he said loudly and thickly. "Help me outside . . . I need some air . . ."

Harb came forward and gave the king an arm. Rajn pulled himself to his feet and leaned heavily on Harb as Harb helped him out into the silent square. Once beyond view from the doorway, however, Rajn shook himself free of Harb's arm and walked with perfect balance around the corner of the building they had just left into a little blind alley where they were out of sight of anyone else.

"Well, Outlander," he said, turning to face Harb. "I've been waiting for you to show up. Name your price."

"Price?" echoed Harb.

Rajn's eyes slitted.

"We each know the other to be no fool, Outlander," he said. "Don't waste my time. You gave us an entrance to this city with an eye to your own profit in some way. I'd be no king but a fool to believe otherwise. Now I ask you what that price is."

Harb shrugged.

"I've told you, King," he said,

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

"what's to your benefit is also to mine. Now you have all the loot and food your warriors can carry. Return home with it and be happy."

"Happy?" Rajn coughed. "There is more than happiness in this, Outlander."

"Why should there be?" said Harb. "I can even tell you how to take home more than you now think you can carry."

Rajn looked at him.

"Say on," said the king.

"You have lost a few of those you started with," said Harb. "On the empty benches in your *canots*, you could carry at least two or three hundred other paddlers."

He paused.

"Say on, I said," repeated Rajn.

"If you'd take a couple of hundred or so stout men and women from that building, there," Harb waved in the direction of the meeting-house where the city inhabitants were waiting their doom, "they could learn to paddle and do portage for you. The *canots* could be more heavily loaded with grain, weapons and other things of worth from this city."

Rajn grunted a negative.

"Those who still live must be sacrificed to the gods who smiled on us and let us capture this city," he said. He shot an ironic glance at Harb. "Or, so my warriors would say if I should suggest what you suggest."

"What's wrong with taking the prisoners home and sacrificing them there?"

"Home? Take who home? What—?" grunted a suspicious voice; and Witta reeled into sight around the corner of the building.

"Cousin," said Rajn, almost sweetly, "a thought has come to me that it would be the least we could do for our village to bring these city folk who still live back to be sacrificed properly upon our hearthstones, that their blood may feed the gods and direct all god-like attention to our own halls. It would be a pity to make sacrifice here and have the gods limit their blessing of us to this place in the plains where we can only come for a brief time on the sword-trail."

Witta stared at him. His lips moved slightly, as if he were repeating Rajn's words to himself. Slowly, his face grew ferocious and turned on Harb. Harb's hand, hidden on the grip of his shield, tightened there.

"Why talk to the outlander?" Witta snarled. "Always the outlander. Let's sacrifice *him* and please the gods!"

"Cousin," said Rajn, mildly, "I am king."

Witta looked slowly back at him.

"King . . ." he said, thickly.

He turned and lurched off out of sight. Rajn swung his gaze back to Harb.

"Your advice is good," he said. "But still I haven't heard your price."

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

"There's no price, King," said Harb.

Rajn gazed at him steadily.

"I won't press you for it now," he said. "But the next time I ask, your answer had better be ready and clear, or you'll never answer questions again."

He turned and went out of the blind alley, rediscovering his drunken stagger as he passed the corner of the building.

So they started back to the forest villages, though not without some difficulties. The first of these was with the warriors in general. Having taken one of the heretofore impregnable cities they were afire to take another one. Harb was forced to testify that only a stroke of luck had made this conquest possible.

That point settled, there still remained those who wished to continue the sword-trail simply for the pleasure of killing and looting, even though they would not be able to carry home any more than they had now. This attitude, however, was met by strong objections from Rajn and the lesser chiefs, who clearly saw their individual advantage of taking home as many healthy warriors as possible. Finally, there was the matter of carrying such a large number of potential sacrifices back with them. Might not the gods be annoyed by being made to wait?

The argument for this went on for half a day before it dawned on Harb that no one was serious about it. The fact that the prisoners could make possible the taking home of more plunder had already decided the matter. The forest warriors were merely soothing their consciences by finding excuses to do what they intended to do in any case.

At last, all discussion over, they loaded their *canots* and headed upstream. This was slower going than the downstream trip; but they were aided by a light prevailing wind from the south at this time of year. Each *canot* hoisted a rag of a sail—much more than a rag, Harb judged, and a *canot* would run a real risk of overturning in a gust—and with this to aid them, they found themselves back in the shadows of the forest vegetation within three weeks.

From this point on, the return went swiftly, since most of their travel was across lakes where there was no current against them. There was a parting celebration at each community where any sizable number of warriors dropped off, and a friendly wrangle over how many of the slaves should be taken by those who were parting from the main body. This was a drain that Harb had not foreseen on the number of captured villagers. He could not complain about it openly, but he ground his teeth in private. It shortened his already strained temper, under pressure with the need of keeping up the appearance of enjoying the return.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Harb found himself taking any excuse at all to get away by himself. So it happened that on one of the occasions when a fair-sized group was parting from the expeditions and the usual party was in progress, Harb wandered off into the woods for an hour or two of privacy. Luckily, as he stepped into the concealment of the branches, he attached the heat-sensing glasses to an alarm in his helmet; some fifteen minutes later the alarm went off.

Automatically, Harb flipped off the alarm and turned on his heel, searching the thick undergrowth for the aura that had triggered the alarm. He found it behind him, upwind. There was nothing in sight to ordinary vision, but the glasses showed an aura, a body the size of a male warrior, some twenty feet away through the thick vegetation. Harb thought quickly, and took a chance with a guess.

"Witta!" he shouted cheerfully, crashing through the brush loudly and openly toward the Homskarter. "What brings you out here?"

With the last words he broke through a final screen of small branches and saw Witta standing, scowling at him. The second-in-command was wearing his sword but no shield, which might catch on branches and make noise going through thick woods. Instead, he had a bow and quiver of arrows slung on his back and carried a spear.

"Hunting," grunted Witta. But he was a poor liar. His self-consciousness of the falsehood he had just uttered showed in every line of his body.

"Good idea," said Harb, cheerfully. "I'll hunt with you. Side by side."

"I'm through hunting," muttered Witta. He turned and crashed away in the direction of the others. Harb followed him.

After that, Harb took to setting the alarm of the heat-sensing glasses at no less than fifty feet of range whenever he went into the woods alone. But Witta did not try to sneak up on him again. The fact that Harb had been able not only to discover him but also to identify him when Witta was unseen and the wind was blowing from Harb to him, apparently had awed the second-in-command.

The farewell parties along the way slowed them down and took their toll of the available slaves; but in time they did return to the lands of the Homskarters. The night before they were due to arrive at the Homskarter village, Harb drew Rajn aside.

"What is it now, Outlander?" Rajn asked, eyeing Harb shrewdly as they walked along the lake shore out of hearing of the rest of the Homskarters.

"About the slaves," Harb said.

"Ho, now it comes out at last," said Rajn, humorously. "Tell me. What about the slaves, Outlander?"

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

"It's still only late spring here, King," he said. "There'd still be time to get one crop in the ground and harvested before fall; and you have seed-grain to spare from the grain which you brought from the plains."

"I told you we were no farmers."

"True," said Harb. "But the slaves are farmers—not only farmers, but experienced farmers, who have grown up in the craft of bringing food from the soil."

"The slaves," said Rajn, "will be sacrificed as promised as soon as we are home."

"I know that was promised," said Harb. He had a feeling of walking on eggs. How much did Rajn really believe in his gods? There was no way of telling. "But what great harm could there be in putting off the sacrifice until after a harvest has been brought in?"

"The gods might weary of waiting and turn their anger against us," said Rajn. But he said it without particular emotion, as a more industrialized man might mention the prospect of an economic downturn. "Besides, we have enough grain to see us through the winter. Enough and more."

"But there may be other forest villages and homesteads who may run short," said Harb. "In which case, if you had grain to spare, you could trade it to them when their bellies begin to pinch, and glean for yourself the best of their wealth . . ." he paused, to give time for the idea to sink in. "Then when next you go on the sword-trail, you would be so strong that the lesser chiefs would not even dare to argue with you."

Rajn said nothing. They continued walking along the shore together in silence. Eventually, Harb broke it.

"This is the way a king may become greater," he said.

Rajn stopped and turned to face Harb, who had no choice but to stop also and face the native.

"Outlander," said Rajn, "I'm not sure but that you want to push us into ways unfitting for warriors. Still . . . if I wished to use these slaves to plant grain, as you say, what could I say to my people? Few among them will come easily to the idea of putting off the gods a second time."

"Tell them you'll give the gods a token sacrifice—kill a single slave as earnest of the sacrifice of all in the fall."

Rajn stood a moment, then turned and began walking back toward the camp. Harb fell in beside him.

"I will give you this much, Outlander. You may suggest this action to me tonight when we sit around the fire," Rajn said after a moment. "Let it come from you and I will listen to what my men answer."

"All right," said Harb. They walked on a few steps more. "By the way, could I also have two of the slaves for myself? A man and

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

a woman, preferably two who're fond of each other?"

Rajn looked at him.

"Such a gift is small return for what you have done for us," the king said. "Choose your pair and be welcome."

"Thanks," said Harb.

That afternoon, Harb picked out his slaves. In actuality, he had had his eye on the pair he wanted for some time. He collected them from the separate camp where the slaves were bedded down and told them to come with him.

That night at the king's fire in the warriors' camp, once Rajn, Witta and the rest of the Homskarters close to the king had reached what Harb judged to be the optimum stage of alcoholic mellowness, Harb got to his feet.

"King," he said, "I have had an idea which you might wish to consider."

"Tell us, Outlander," answered Rajn, blurring his words only slightly. He glanced at the Homskarter faces around the fire, producing an immediate silence.

"Thank you, King," said Harb. He glanced over his shoulder to make sure his two new slaves were standing side by side at his back as he had ordered them to, once he stood up. He looked back at Rajn and the warriors. "It came to my mind that this winter when food gets scarce for those other villages which have not won as much in prizes on the sword-trail, that you and your Homskarters might gain both wealth and power by trading grain to those less fortunate, for whatever price might be obtained."

There was a moment's pause, then a slow mutter of approval generally around the fire. Only Witta and several warriors sitting on either side of him sat grimly with closed mouths.

"A thought worth telling," said Rajn nodding. "Though I should have thought of it myself probably, when the snow was deep. But there is no knowing whether we will have much extra grain to trade. We must make sure our own bellies don't go empty first."

"King," said Harb, "there is a way you might have all the grain your bellies need and yet have ample to trade with."

"And how is that, Outlander?"

Harb pointed toward the slave camp.

"You now have slaves who are skilled at raising grain," he said. "Put them to labor in fields through the summer and store up riches of food to be used as you wish."

"Those slaves are promised to the gods!" snapped Witta. "By summer their bodies will be nothing but dry bones!"

"Could not the gods wait until fall? I am an outlander, and of course don't know the answer to questions like this," added Harb hastily, as the ring of faces and bodies about the fire went rigidly

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

still. "but it occurs to me to ask if the gods wouldn't be willing to wait, just this once."

"They've waited already!" said Witta. He turned to Rajn. "Cousin and King, are we to flout gods? Gods who can send us a winter that never ends? Gods who can turn our blades aside from the foe when we next go on the sword-trail?"

"Forgive me!" Harb raised his voice above Witta's. "I meant no disrespect to the gods. But if they are truly the gods of the Homskarters, I'd think for their own benefit they'd wish to see the Homskarters grow strong and bring them back many slaves for sacrifice every year—not just one. And it isn't as if they're being cheated of their present sacrifice. We need only to send them a messenger promising them that after the harvest is in all slaves will be sent to them, as well as many slaves each year from now on, when the Homskarters come back laden from the sword-trail!"

A shiver went through the bodies around the fire.

"A messenger? To the gods? Outlander," said the voice of Rajn, "who would carry such a message to the gods?"

"I have someone," said Harb.

Without hesitating he stepped back and to one side, drew his sword, and struck with it at the neck of the male slave behind him. The technologically sophisticated blade took the slave's head completely off, and the body fell. With a cry, the plains woman fell on her knees beside the body; and without hesitating, Harb struck again, stretching her lifeless above the dead man.

"You saw and heard," said Harb to the Homskarter, "the woman loved the man, therefore her ghost will follow his. He will be your messenger to the gods and she will come after him to witness that what he says is truly your intent."

There was a second with only the crackling of the fire to be heard. All the Homskarters were staring at the two bodies.

"Outlander," said Rajn very slowly into the silence, "I think you should leave us now. You are not one of us and we will talk of our gods alone."

Harb turned and went off. He went a good distance off, as had become his habit since he had discovered Witta following him. His equipment showed him a way through the pitch-dark woods to a spot in which he did not think any number of Homskarters were likely to find him before dawn. Curling up in a comfortable hollow, he set the thermostat on his clothing to keep him at a comfortable warmth, and fell asleep.

In the morning, he rejoined the natives, and they started out on the last half-day of travel that would bring them home to the Homskarter village. Neither Rajn nor any of the others said anything to him.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

However, he noticed that a cairn of rocks had been raised and the bodies of the two he had slain were laid on top of it, out of the reach of animals. This was the procedure of the forest people in offering sacrifices to the gods; and there could be only one reason why those two bodies were being treated as sacrifices. Harb smiled.

They continued on home. There, once the festivities of their return were over, Rajn spoke once more privately to Harb.

"It may be," said the king, "seeing you're of the same kind as the Other who scratches in the dirt with those cast off from our own people; that you, like him, know something of the growing of grain. Therefore, since it was a wish of yours to see us supplied with growing fields, suppose you take over the direction of these slaves and make them produce."

Harb had not bargained for the job of agricultural director, but things were going too much in the way he had planned for him to raise objections—even though it did not take more than a half an eye to see Rajn's true reason in putting him to work. If the fields and all that derived from them should prosper, then that would be all to the credit of the wise ruler who had permitted such an undertaking. While if anything should go wrong, then it must obviously be a case of the gods dealing with the impious outlander who had dared to suggest delaying their sacrifice.

Harb did not blame Rajn for this particular ploy. It was, he thought, gazing at the king's retreating back, exactly what he would have done in Rajn's place. Rajn and he were both clever minds; and all-powerful as the king seemed to be, it was necessary that he keep safely always on the side of the majority opinion. Otherwise some ambitous aspirant for the throne might one day be able to lead a successful uprising against him. Luckily, in the case of any such happening, Rajn had the four-square respectability of Witta to retreat behind. No one could doubt Witta's devotion to the traditional ways. But it paid to make doubly safe by having a scapegoat ready, if necessary, as Rajn had just done. Harb respected him for it.

He set about the job, organizing the slaves into two teams, one to clear the land, and one to loosen the earth for planting by jabbing it with the fire-hardened, sharpened ends of sticks. By these primitive methods he managed to clear and prepare fields. Then he put his slaves to the process of drilling holes in the loose earth with their pointed sticks, and handplanting his seed grains.

There seemed to be a different attitude toward him on the part of the slaves now. He could not put his finger on any specific sign of it; but he could feel it, almost like a solid wall of emotion when he was

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

out in the field alone with them. Helmeted, armored and with sword and shield, he had nothing to fear from even fifty of them. Nonetheless, he began to be aware that if he should show any sign of weakness or fear, the slaves nearby would be on him like predators upon a wounded prey.

It puzzled him for a while. The slaves had showed no such deep hatred for the Homskarters. Then he realized where the roots of their feeling lay. They had all come to know how he had sacrificed two of them at the camp the evening before their arrival here, and that knowledge had triggered an emotional reaction in them reserved for him alone. To these people of the plains, the forest warriors were a natural disaster. When they came and killed, you mourned the dead, but that was all. Raiders were something to be endured, like a flood or a stroke of lightning.

But Harb was not something natural. He was alien, strange. To be killed by him was an unthinkable thing; while to kill him was instinctive reflex, as it might be instinct to kill a poisonous snake, even though it was not threatening you at the moment. Understanding this, for the first time Harb realized why Rajn, alone of the Homskarters, had ever had much to do with him. The Homskarters must have an instinctive antipathy for him, also; an antipathy that was personified in Witta, and which explained that individual's actions toward Harb.

It was curious, thought Harb suddenly, as he stood in the late afternoon sun on one of his fields beside the lake and watched the slaves drilling individual holes with their pointed sticks to take two grains apiece of the cereal they were planting, but the antipathy the Homskarters showed to him seemed to be entirely missing in the case of Bill Cohone. True, they made fun of the volunteer and scorned those of their own kind who went to work with him; but clearly not only those natives Cohone had "converted," but the rest of the Homskarters had no dislike for the amateur human xenosociologist. In fact, just the contrary. They seemed almost to have the sort of amused contempt for Cohone that bordered on a near-affection—for no good reason that Harb could see, except that Cohone had more or less fallen into the role of buffoon as the natives saw it.

All the same, thought Harb, it was too bad matters were not the other way around, with the natives hating Cohone and not disliking him. He had now done almost everything he had set out to accomplish. In a few months there would be grain to harvest, giving the Homskarters a tradable surplus. This wealth would make life good for them, for which they would give credit to the gods and assume that the taking of slaves and the growing of grain was not only prof-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

itable but blessed. Wealth, inevitably, would breed power. The Homskarters were on the way to ruling all the forest tribes and eventually forging an army of conquest that would go down to occupy and rule the kingdom of the plains. Pre-history here on 49381D was all but nudged, now, into a new, accelerated path.

However, there remained the matter of tidying up. It was quite true, as he had told Cohone, that the private rule of the emerging professional group among those who operated on the stellar frontiers was "survival of the fittest" and that the rule was not to avoid breaking the rules, but to make sure that if you broke them, you gained more than the rule-breaking cost. Harb's own professional superiors would wink at his bringing in and using the tools of a high technology among these primitives just as long as his doing so got results and accelerated the local growth toward civilization. By getting results, even at the cost of breaking rules, Harb would have fulfilled the harsh letter of the survival code, and his superiors would cooperate in hiding any bad marks that otherwise might appear on his record.

But beyond those superiors, there were the older human worlds, and particularly Earth itself, well-supplied with impractical armchair theoreticians and bleeding-heart types. If some influential individuals of that stamp should get wind through Cohone of what Harb had done here, and if a public outcry should be raised, Harb had no doubt his superiors would not hesitate in throwing him to the wolves. By the standard they used he would have failed the survival test.

It followed, therefore, that from the beginning Harb had been alive to the necessity of keeping Cohone from talking. That was why it was too bad that Cohone's Homskarters were not just waiting for a chance to kill him, as the slaves were Harb. The rays of the late afternoon sun struck suddenly into Harb's eyes as he turned, charging the landscape around him with the color of blood; and sudden inspiration woke in Harb's mind.

Of course Cohone's converts were not like Harb's slaves—waiting for the first opportunity to kill him—*but no human except Harb himself knew that fact!*

That evening, Harb asked to speak to Rajn privately. They climbed together to the tower that was the scene of their earlier conferences. The summer moon of 49381D was high enough above the horizon to give some light now, and the nighttime air in this season was almost balmy. Above them, the stars twinkled so brightly they seemed almost within reach of an upstretched arm.

"What is it, Outlander?" Rajn asked.

"A small problem, King," said Harb. "The outlander you call the

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Other has become jealous of me because I am growing more grain than he has been able to do with his handful of followers."

Rajn stared at him. In the moonlight the Homskarter's round face was clearly visible, but his eyes were ovals of jet, unreadable.

"How do you know this, Outlander?" Rajn said. "You haven't been close to your fellow since we left on the sword-trail."

"We of our kind know much of what each other is thinking," Harb said. "It's one of our ways. I tell you about this, King, only because the Other may now do something to cause my fields to fail, or the slaves to die, so that they would not be available for the harvest, and the sacrifice to follow."

"How could he do such things?"

"I don't know yet," said Harb. "But he may have some means that is *magic*."

Harb paused deliberately before the last word to make sure that the king understood. But he need not have worried. There was nothing dull about the perceptions of the Homskarter ruler.

"I see," said Rajn slowly. "Surely now, that would be something unfortunate. One magic bowl and one magic sword is enough magic for this kingdom. Nor would it be agreeable to me to lose the grain that you will grow; and very unhappy indeed it would be to have the slaves die before they could be properly sacrificed. What does the outlander think can be done about his brother uplake?"

"I'll go talk to him," said Harb. "Perhaps I can find out what he plans to do. Then I'll come back and talk some more with the king. I've hesitated to do this until now because I've got no one besides myself to look after the slaves while I'm gone."

"Don't concern yourself about that." The jet ovals of Rajn's vision narrowed thoughtfully. "I'd already planned, I remember now, to take them from you for a day or two and put them to work cleaning and mending the *canots*."

"That's good, King," said Harb. "I'll leave first thing in the morning, then."

He was at Cohone's station by two hours after sunrise the next day. It looked no different than it had looked before except that the crops in Cohone's small field, obvious fruit of planting late the previous fall, were now standing tall and almost ready for harvesting so that a second planting could be gotten in.

Harb smiled internally, however, at the number of the Homskarters he saw around the station. Instead of the four that had been there when Harb landed, Harb now saw more than a dozen. It was not the sort of increase that indicated any sudden new success on Cohone's part in recruiting the natives to ways of primitive agriculture and industry, but any increase at all

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

could be used as evidence to substantiate what Harb had told Rajn the night before.

Bill Cohone was supervising what seemed to be the digging of a well. Like the rest of the scene, he could have almost stepped just now out of the moment of Harb's landing. Shirtless, half-bald, red-faced and undernourished-looking, he broke off what he was doing to come down to the landing as Harb drove the prow of his small *canot* ashore with the outboard motor still attached to it.

"I've been hearing about you," Cohone said, as Harb stepped ashore and started up toward the building that was both Cohone's home and headquarters.

"Oh?" said Harb. "I didn't know you had a phone link to other parts of this planet."

"Don't try to make a joke out of it!" said Cohone, walking beside Harb as he climbed the slight slope from the water to the building. "My converts hear from the other Homskarters, and tell me. And lately Witta's dropped by to give me some of the details about what happened on that expedition to the plains. You're a murderer!"

"It depends on how you define whoever's killed," said Harb. He reached the door of the building and put his hand on the leather strap that latched it. "I've got a call to put in to Sector Headquarters. I don't suppose you'd consider resigning for reasons of health?"

"Like hell!" Cohone's hands were clenched. The skin of them was as usual dirt-stained, and their bones were larger than his skinny body would have indicated. The knobby fists he made were not ridiculous. "Is that what you came for?"

"I told you—I came here to put in a private call to Sector," said Harb, opening the door. "Do you mind?"

Cohone stood back, scowling. Harb went in, closing the door behind him. He found himself in a large single room that was hardly more than a primitive cabin, except for the bank of powerful interstellar communications equipment in one far corner. He went to the equipment, sat down, put a headset and throat mike on, and keyed in Sector Headquarters.

There was a short wait. Even with a relay satellite in orbit around the planet and the newest of phase-shift equipment, a translight call of some twenty parsecs was not made immediately. But then the ready light on the control face of the equipment lit up.

"This is Sector," said a voice from the speaker within the bones of Harb's inner ear. "Come in, 49381D. Go ahead, Cohone."

"Sector Chief Mallard speaking," said Harb, dryly. "I'm just using Cohone's equipment to put in a call."

"Oh, sorry, sir."

"All right. Listen, Cohone isn't

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

looking too well, I think he's been overworking and over-identifying, rubbing these locals the wrong way. I suggested he resign for health reasons, or at least a leave of absence, but he wouldn't go for it. Would you get a medical officer in here to have a look at him?"

"Right away, Chief."

"Good. No need to get Cohone worked up. Why don't you send the pod in as if it was a routine delivery of something like updated communication equipment, and not mention that the med's aboard. That way the med can get a good look before Cohone has a chance to tighten up on him."

"Yes, sir."

"Good. I'll be finishing up here in about two more months. Any emergencies in my office?"

"No, sir. Deputy Chief's advisory says everything's going routinely."

Harb silently blessed his choice of an ambitious young Deputy Chief who thought he stood a chance of taking over Harb's job one of these days when Harb himself was promoted.

"Good. So much for now. Out."

"Out."

Harb shut off the equipment and went back outside the building. Cohone was nowhere to be seen. Harb hesitated, wondering whether to wait for the man and talk to him a while for apprearances' sake, so that the word of their interview would be taken back to Rajn. But after all, they had had some conversation in their own tongue while walking up from the *canot*, and that was probably enough gossip to be relayed back to the Homskarter king.

He took his *canot* and went back to the village. Once there, he sought out Rajn.

"King," he said, "I'm afraid I wasn't able to find out just what the Other is going to do to your slaves and crops, but it's very clear that he plans to destroy both."

"Stop him, Outlander."

"I can't," said Harb.

Rajn's voice was as cold with suspicion as if Harb were a stranger encountered for the first time.

"Why not? Is he stronger than you?"

"No," said Harb. "He's nothing, compared to me. But he has friends. Not great friends, or many friends, but enough to make it impossible for me to stop him at this time."

Rajn stared at him.

"Are you seeking a price from me, Outlander?"

"No," said Harb. "It's not a matter of price. It's just that in this instance I can't help you. But, King . . . you can help yourself."

"I?"

"If his crops should be flattened, and all those at his place should be slain—"

Rajn coughed dry laughter.

"You should know me better, Outlander," he said. "I'm not a

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

fool, to kill your brother for you when you dare not kill him yourself."

"No—I don't mean that the Other should be slain," Harb said. "Only that those of your own people who have fallen away from you should die. Then he'd have nothing to do here; and he'd have to leave."

Rajn stood motionless in silence for nearly a full minute. It was impossible for Harb to guess what the Homskarter was thinking.

"He's done us no harm so far," Rajn said. "And I've only your word for it that he intends harm now."

"Hasn't my word been good so far?" demanded Harb. "And besides, isn't a wise ruler one who takes care of trouble before it can begin? Also, King, what have you got to lose—a handful of your own people who aren't even your own any longer."

Once more Rajn thought.

"All right," he said abruptly. "But it won't be easy to find someone to lead warriors against some who were once our own people."

"I thought of that," said Harb. "Surely, there are two whom your warriors would follow into anything. Yourself, and Witta."

"Neither I, nor Witta, for this," said the Homskarter king. "But I will find someone. And may the gods help you, Outlander, if you have counseled me badly in this doing."

The following morning early, Witta took a hunting party into the woods at the king's request. Shortly thereafter Harb took his small *canot* and started once more uplake in the direction of Cohone's station, following about an hour behind a good-sized body of warriors in three large *canots* who had left earlier in that direction, shortly after Witta's group was gone. Harb drove his *canot* to within half a mile of the station, then beached it under the cover of some overhanging brush and made his way on foot up to the fringe of the forest from which he could look into the cleared area that held the fields and the station.

The fields were silent. What lay among the stems of the tall grain it was impossible to say, but close to the main building on the open ground were what might have been bundles of rags lying on the ground, showing here and there the colors used in non-royal Homskarter body, arm and leg wrappings.

Harb set himself patiently to watch. An hour or so went by and the sun warmed. Finally, the door to the building opened by slow jerks and the head of Cohone peered out, followed slowly by his full figure. He stood before the door and stared about him, at the apparent bundles of rags. Slowly, he moved to examine them, one by one. He walked like a drunken man; and after he had gazed at the last one he could find, he stood

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

and stared downlake toward the Homskarter village for a long time. Then he went back inside.

Harb stayed where he was, waiting. Late that afternoon, Cohone reappeared, carrying a piece of equipment which the rules required be kept securely out of native hands—a collapsible metal shovel, now extended into working position. With this, he dug holes in the earth and attempted, one by one, to bury the rag bundles. But the effort seemed to drain him of strength, and when it began to get dark, he stopped with two bodies still unburied. He went back inside; and Harb found a comfortable patch of earth under a tree, set his clothing thermostat at a sleeping temperature, and dropped off into slumber.

With sunrise, he renewed his watch. About mid-morning a pod descended from an interstellar craft and the pilot, together with another man wearing the white shoulder patch of the Medical Arm, left it, came to the building and let themselves in. A second later, Harb heard faintly the sound of hysterical yelling from the building, and Cohone burst out of the door, running toward the grain fields. The two men followed, caught him, and did something to him. Suddenly Cohone went limp. The others carried him to the pod, shut the hatch behind them, and the pod took off, to lose itself in the brilliant blue of the summer sky.

Harb stood up, stretched with satisfaction and walked back to his *canot*. As he drove the *canot* with the outboard motor back toward the Homskarter village, his feeling of satisfaction grew. Cohone's testimony would be suspect from now on; particularly in view of the fact that Harb had asked for medical help for him two days before his mismanagement of his station resulted in the massacre of his converts by the wild natives. It was a bonus that Cohone had evidently grown close enough to his converts so that seeing them slaughtered had driven him into a real state of emotional shock. Of course, they could cure him in a few days, but that would not change anything. The view he had acquired here on the planet would remain suspect. In a couple of days Harb could drop by the station, be shocked himself by what he found and call Sector Headquarters, to be more shocked by what he was told of Cohone's emotional condition. It was all tied up now. Mission accomplished.

Harb reached the village and tethered his *canot* at the wharf. There were only a couple of older male villagers armed and on duty there, and these did not answer when he spoke to them. Harb guessed that they would by now have heard of the raid on the station, and perhaps these two had owned a friend or relative among the converts. Harb ignored them and went up through the near-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

empty streets to the house of the king.

The doors of the big house were open and two other Homskarters Harb did not recognize were on duty. From within came the sounds of a very large celebration taking place, rather than the ordinary afternoon drinking and arguing. Harb went up the steps without bothering to speak to the new guards and stepped inside. The main hall was packed with warriors shouting, laughing, and drinking.

Harb started down the open center lane between tables that led to the small table of the king, blinking his eyes in the dimness to get the dazzle of the sunlight out of them. It was a technique he had become expert in since returning from the expedition to the plains.

Abruptly, all sound in the hall died away. Harb was surrounded by total and unexpected silence. He stopped, blinking furiously, and slowly the scene became clear around him.

On every side, warriors were leaning forward, staring at him, motionless. A dozen steps in front of him—for he had covered almost half the distance through the hall automatically—stood the table of the king. But Rajn was not behind it. There was only Witta, who sat staring at Harb as the warriors stared.

There was something strange about those stares; something possibly—not for the first time Harb cursed the fact that the Homskarter features were all but impossible for a human to read emotion from—savage and triumphant. Obviously some unusual event had taken place, but what? Whatever it was seemed to be connected with the fact that Rajn was absent. Could Witta have taken advantage of some short trip of the king's to set the Homskarters here to taking some sort of action against Harb? It was unthinkable that Witta should suppose he could get away with such a thing. Once the king returned, Rajn would have to take action himself against Witta, if only to reestablish the fact that his authority was not to be flouted.

On the other hand, these primitives were sometimes incredibly stupid about the future results of their present actions. Harb came to a decision. If Witta was trying anything, the thing to do was to face him down sharply and decisively, right now before the situation had a chance to gather momentum.

Keeping his eyes on Witta's, Harb stepped out and strode briskly forward toward the table. He was almost to it when he stumbled and nearly went down, checking himself just before he fell over something that he had not noticed until now, lost as it was in the shadows of the reed-strewn floor.

He looked down. The body of a Homskarter lay at his feet. Blood from more than a dozen wounds had dyed red the white wrappings

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

of arms, and legs, and the upper body. The head lolled to one side, grimacing in death. It was Rajn.

Harb stared down, unbelieving. What he was looking at could not be. He raised his head to demand that Witta tell him what had happened; but the first sounds from his throat were drowned in the gleeful roar with which the warriors came pouring over their tables to hurl him down and pinion him upon the floor.

Nearly a week later what seemed to be a small sun came down from the sky to hover over the Homskarter village. The mighty voice of a god spoke sternly in flawless Homskarter to the villagers, saying that several outlanders would descend and move among them, and that by no means was any Homskarter to venture harm or interference to those who would land.

At this, all those in the village began to shake with fear. They crouched low on the ground and tried not to look when a small flying box such as had come down to Cohone, descended, and three outlanders got out. One was Cohone himself; and seeing him, some of the braver warriors ventured to raise their heads and watch as the three went past them and up to the king's house, to the tall tree from which hung the woven cage.

"Allah!" said the man with the white patch on the shoulder of his upper garment, gazing at the thing inside the cage. "Let's get him down from there."

The other man and Cohone undid the knot that held the rope by which the cage was raised into position. The cage came to the ground, the door was opened, and the three reached in. The creature that was Mallard, however, did not want to come out. It cried and crouched away from them; but by main strength they got it from the cage and the one with the patch on his shoulder touched it with a small glass tube, after which it went quiet and very docile; and the one with the white patch was able to lead it, shambling and crouching, and sometimes even falling, down to the pod.

The other two started to follow; but a Homskarter warrior came crawling out of the open door of the king's house and writhed toward them, face down to the dust, up to their very feet. They stopped. The warrior lifted his face. It was Witta.

"Don't let the devils kill us!" he said to Cohone, clutching at Cohone's ankle. "There was no more we could stand, so we put him in a cage. We did not kill him. We only put him in a cage."

Cohone reached down and urged Witta to his feet.

"The devils won't kill you," he soothed. But Witta still clutched him, now by the arm.

"We've sacrificed all the slaves," Witta said, pleadingly. "I sent war-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

riors to put back all that was damaged where you lived. There are those who will come to take the place of those killed by the order of Rajn, when he was made mad by the devil we put in the cage. All the fields that the slaves cleared for us have been plucked clean of any growing thing. Only your fields remain with grain still on them. Come back to us. Teach us what to do and we will do it! But protect us from the devils!"

Cohone gently pried Witta's fingers from his arm.

"I'm coming back," he said. "Go tell your people that."

"Thank you. Thank you. Thank . . ." said Witta, backing away. He turned and ran into the dark safety of the king's house.

"You see?" said Cohone, grimly, turning to the man beside him. On the man, the twin stars of a Departmental General glittered at the yellow sunlight. "You believe me now about what Mallard did?"

"I believe you." The DG nodded. "It's plain enough what he tried. And if he'd succeeded we'd be patting him on the back right now. But it backfired on him—and I still don't understand exactly why. These people haven't developed consciences yet, surely."

"Of course not!" said Cohone. "They've got what came before conscience and was meant to do the same work. *Custom.* I warned Mallard that if he pressed these people too hard, they'd bounce back at him. You realize that was all he did that was unworkable—press them too hard? Everything else was quite acceptable by their standards, the advantage-taking, the enslaving of captives, the killing of helpless people for sacrifice? He only made that one mistake—being too successful."

"Too successful?" The DG raised his sandy eyebrows. He was as tall as Cohone, but more athletically built, in spite of his age—which was perhaps twenty years older than that of the amateur xenosociologist.

"That's what I said." Abruptly, Cohone started to walk back toward the pod and the DG came along with him. "He was giving Rajn advice; and everything he got Rajn to do, worked. Actually, it was Rajn who became too successful. He was doing nothing but breaking custom and coming up covered with roses every time he did it. Finally, he went too far in killing my converts."

"But I thought these village people had no use for the converts?"

"They didn't. But the converts were Homskarters, after all. If killing them turned out to be a successful thing, then who was next to be sacrificed to a change of custom? Custom to these people is what common law was to Englishmen before written statues—the only machinery there is to make sure the world works in orderly

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

fashion. When it began to look as if Rajn could kill his own people and get away with it, that had to be a sign that a devil was loose in the world."

"And we know who the devil was, unfortunately," mused the DG.

"Unfortunately," said Cohone, grimly, "so did the Homskarters. They took the obvious step. Replaced Rajn with a conservative king and locked the devil up in a cage where he couldn't cause any more trouble."

"Well, well," said the DG. They were at the entrance to the pod. He stopped. "In any case, it's worked out well. It looks like you'll have them eating out of your hand when you get back here."

Cohone also stopped. He frowned.

"If I do come back," he answered slowly.

The D G looked closely at him.

"You said to that new king—" the DG began.

"But then you said"—Cohone darted a glance at him—"that if Mallard had been successful you'd be patting him on the back right now. He told me you HQ people were operating privately on a principle of survival of the fittest—that anything anyone could make work would be accepted. But I didn't believe it. I don't think that way myself; and I don't know that I want to work for people who do."

"Look here, Bill," said the DG, putting his hand on the edge of the open hatch and leaning toward Cohone. He lowered his voice earnestly and confidentially. "Mallard told you the truth, and you might as well face it as a fact. We're a young race, a small race, just beginning to stick our nose out into the universe. How the hell do we know what's right to do when we run across a planet of intelligent non-human locals? We can try to apply our own ethical and moral standards, but who knows if that's the best thing for them?"

"It's better than survival of the fittest," said Cohone, "which is just another way of saying that what works is justified—after the act."

"Exactly," said the DG.

"Well, it didn't work here," said Cohone with near-savage satisfaction. He pointed into the pod. "Go take another look at your success story."

"He's not a success story," said the DG.

"You just said he was."

"No," said the DG. "You said he was. From our standpoint he ended by failing. That wipes him out. Survival of the fittest means just what it says. His way failed. Your way, judging from what that local said back there, is working."

He poked a rigid finger into Cohone's chest.

"You're the success," he said. "So we go with you—until something trips you up, and *you* fail. And you'll go along with us—or

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

else regret to your dying day that you didn't finish up what you've started here with these people."

The DG withdrew his finger and stepped through the hatch into the pod, leaving Cohone alone in the sunlight.

"Coming?" asked the DG from within the shadow of the hatch. "Or staying?"

"I'll call for transport when I need it," said Cohone harshly. "Right now I've got to clean up the mess your professional left."

The DG nodded. The hatch closed and the pod lifted, dwindling rapidly to nothingness in the blue of the sky. Cohone looked at the village, where a few timid faces were beginning to peer from doorways and windows; and his mind began to click automatically with things to do.

It would be best to get the station back on a working basis as soon as possible. Right now Witta and the other Homskarter leaders were eager to please. The wise thing was to nail that reaction down while it was still strong. In fact, all the effects of Harb's intrusion should be burned in deep while these were fresh . . .

Cohone laughed a little bitterly, remembering the DG's parting question. Staying? Of course, he was staying! Harb's coming had offered the greatest opportunity in ten years of hard work; and Cohone had grasped it eagerly.

From the first he had known what would result from Harb's plans. Oh, of course, he had warned the other man—knowing that Harb would not listen. But he had been careful not to warn Sector Headquarters, or anyone elsewhere who might have paid attention.

No, the chance had been too good to pass, the opportunity to replace an intelligent, innovative Homskarter king with a dull-witted conservative who was maneuverable *within* the native cultural pattern. Poor Harb had been the real amateur, just out of the Academy with his head full of ambition and shortcuts.

Cohone had been the professional. A grim professional whom ten years of struggling with the Homskarters had produced. Once he would have been horrified at the thought of the price in native lives that must come from letting Harb have his head. Now, he accepted it, for the sake of results. He was not yet a thoroughly bloody-minded man, thought Cohone, but he had finally reached the point where he wanted results.

He laughed once more, with the same touch of bitterness. Then he began to walk back into the village with long strides.

"Witta!" he shouted into the silence, there. "Witta! Come out, King, and listen! I've many things to tell you; things you'll have to do if I'm to keep devils like that last from your doors from now on!" ■

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

RENDEZVOUS IN 1985

Catch a falling star? As silly as trying to fly to the Moon! Unless we prepare *now*.

RICHARD C. HOAGLAND

There has been much discussion during the evolution of our national space effort as to the primary reason for its existence. NASA, when pressed into the ultimate corner, will usually fall back on this one: ". . . to better understand the origins of Earth and the rest of the Solar System." The search has been for primeval material, for only through study of something relatively undisturbed since the formation of our stellar primary can we hope to probe back through billions of years to the conditions that brought it all about. The catch is that not very many places have gone "relatively undisturbed" even in space, across 4.5 billion years.

For a while we thought the Moon might be such a place. That was what all the furor over the "oldest rock" was all about. We should have known better. What our grand Apollo adventure taught us about the lunar origin stops just about at the point where it really begins to get interesting: at the point of lunar formation. What we now have of hard-core data from the Moon has gone a long way in delineating the history of the lunar surface from the time of formation to the present. It does not, and probably cannot, tell us where, when, or how the Moon was formed in the first place. Even on the Moon, where nothing major has happened for over three billion years, the *original* record has been destroyed—forever.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

The rest of the "classical Solar System" does not seem much better. Venus is a seething hell, long since modified by everything from internal activity (although how can *craters* continue to exist if internal geology is busily moving crustal plates around?) to chemical erosion of its surface under a stifling blanket of 100 atmospheres of pure CO_2. Mercury? Mariner 10 reveals a differentiated planet battered by impact debris and apparently highly modified by the process of its evolution. Mercury will be an excellent place to study that process. It will not answer the original question: what were conditions in the Solar System like *before* there were planets, or a star, and *how* did they form? What about Mars? Great for geology, biology, meteorology, and spacefaring Lawrences of Arabia. But not good for Solar System cosmogony for the same reasons Earth isn't. Too much has gone on. The real estate has appreciated in value to everyone but the astronomer interested in the primordial history of the System!

The outer planets? We have only begun our survey of the outer Solar System. Beyond the asteroid belt lie four major planets and twenty-nine satellites. Jupiter, alone, is the equivalent of a miniature solar system with, according to Pioneer 10, its major satellites (four) decreasing in density with increasing distance from the planet as do planets with increasing distance from the Sun. With the exception of Pioneer 11 (now en route to Saturn via Jupiter) and JPL's Mariner Jupiter/Saturn (launch date '77), NASA has no plans for detailed exploration of the outer Solar System. It may be late in this century before a Surveyor-type lander is directed to the surface of one of the four Galilean satellites of Jupiter. And even then, it will only report on surface conditions of one moon with millions of square miles of surface area, from one location; and this will be from only *one* of four very different satellites within the Jovian system. Furthermore, the environment on which it reports will have definitely evolved under very precise *Jovian* conditions, having only a peripheral relationship with the rest of the System, as a whole.

The point is that there may be no definitive "relatively undisturbed" location *anywhere* in the Solar System! It may be that a total picture of how the System came to be will have to await analysis of all the data from orbital reconnaissance and landings on most of the major bodies orbiting our star. And that could take us the rest of this century and a good part of the next to assemble.

That is going about things the hard way. At the moment we don't need infinite detail on all the objects orbiting the Sun, to set limiting parameters on initial conditions before the formation of the planets.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

All we need is a good look at one object definitely known to be left over from the "before time." (A piece of it to take home would be frosting on the cake.)

Is there such an object within reach of our technology? The answer, now that we have seen Kohoutek, is yes.

About mid-October 1973, Dr. K. L. Franklin, Chairman of the American Museum-Hayden Planetarium, calculated, from orbital elements supplied by Dr. Brian Marsden of the Smithsonian Astrophysical Observatory, that Kohoutek was a "new" comet. Its orbit, he discovered, was an enormously elongated ellipse, 58,000 times longer along its major axis than the Earth's distance from the Sun. The period of an object traveling such an orbit would be on the order of two million years! If Kohoutek had made this lonely journey even once before, its witnesses would have gazed upon its spectral encounter with the Sun from the Dawn of Human Consciousness at Lake Rudolf and the Olduvai Gorge.

It was this quantum jump across the entire breadth of human existence, from our beginnings in the Pleistocene Era to three pairs of eyes gazing out from the vantage point of man's first space station which gave the whole Kohoutek saga the atmosphere of a slice of "2001." Such an enormous orbit—a quarter of the way to the nearest stars—meant this comet was plunging toward us as an emissary from the distant origins of the entire Solar System. It was a genuine member of Oort's hypothesized "comet cloud," a vast halo of objects orbiting as far away as 100,000 times Earth's distance from the Sun. Furthermore, early radio telescope data successfully detected the whispering emissions of two key molecules never before detected in comets but observed for a couple of years in interstellar clouds—methyl cyanide (CH_3CN) and hydrogen cyanide (HCN). The presence of these in Kohoutek strengthened the feeling of many who believed that comets were the *initial objects* formed as the primeval solar nebula contracted from the interstellar medium. Maybe in comets complex organic molecules might reside—amino acids, proteins, perhaps even DNA itself. It is possible that life—or the pre-ingredients for life—originated there, awaiting only the preparation of an appropriate environment—a planet—and a chance impact to begin the evolutionary cycle which had brought three men into space to view this emissary from their past.

Thus, in an actual visit to a comet, men could sample, perhaps, not only fragments of genuine material from that distant "before time," but possibly material from across five billion years which led to their existence. Only a direct rendezvous will tell us if these fas-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

cinating possibilities are true.

Comet Kohoutek reached perihelion December 28, 1973 and is now receding, back into the cold from where it came. Halley's Comet, most famous of them all, is even now falling toward the Sun between the orbits of Uranus and Neptune, toward a historic rendezvous a decade, more or less, from now. How should we prepare?

Unlike planetary missions, proposed fly-bys or rendezvous with comets pose some very special problems—particularly in this era of uncertain NASA funding. Let us begin with position.

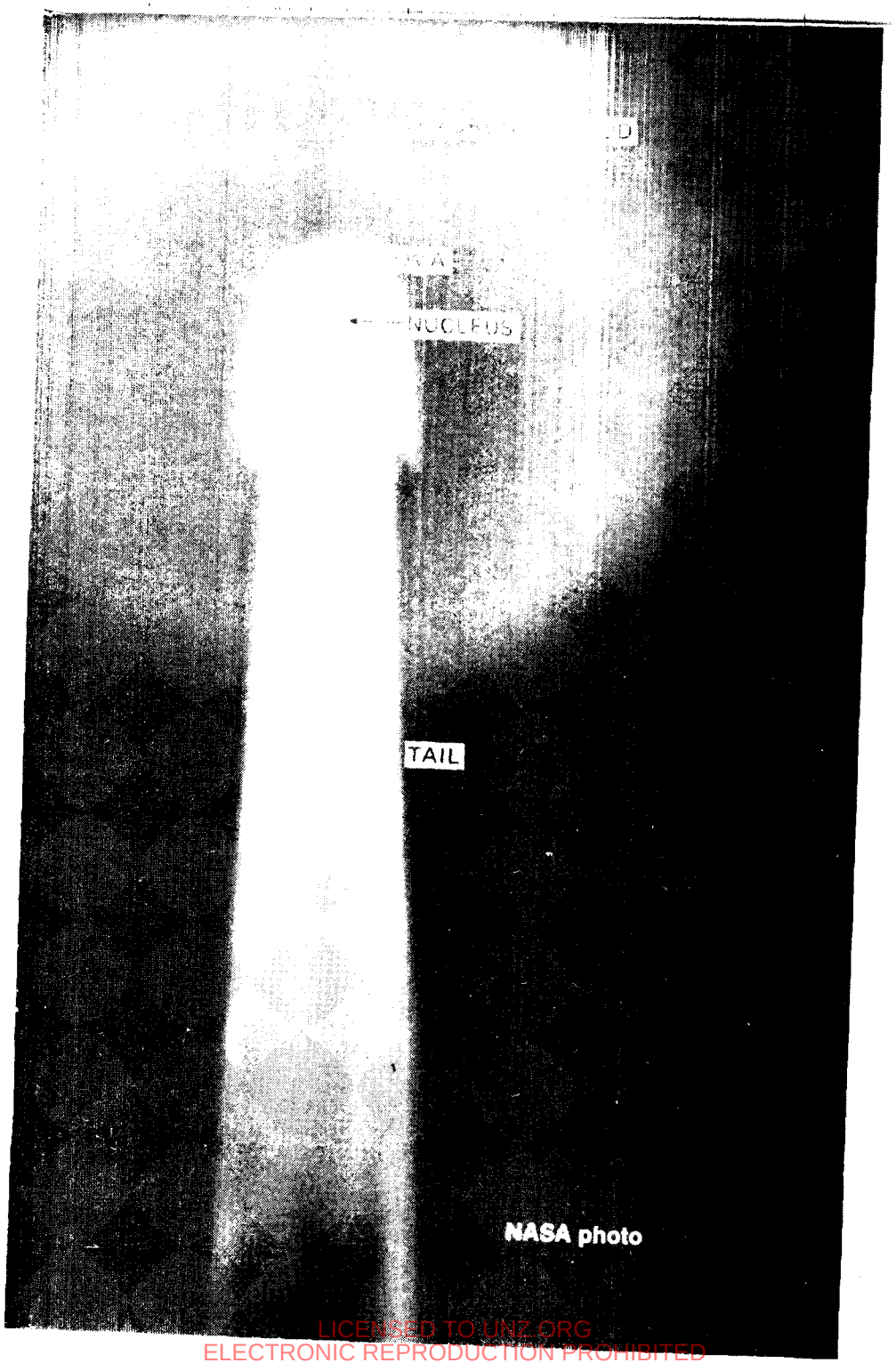
In planning a mission to a planet (Venus, Mars, Jupiter/Saturn), you begin with one certain piece of information: the location of the target. Ground-based astronomy has had centuries of observation to develop ephemerides of the major bodies in the Solar System, so that if you launch a spacecraft this afternoon, you know that at rendezvous (in a year or two) the selected place of encounter will be within a few miles of where your computers say it will be. Not so with comets.

The current working comet model was first proposed over twenty years ago by Dr. Fred Whipple, then Director of the Smithsonian Astrophysical Observatory. It has been described, variously, as the "fluffy snowball model," the "frozen something" model, or (the one I like particularly, considering how I had to describe our plans to the captain of the *Queen Elizabeth II* on the occasion of our recent cruise/conference during Kohoutek's passage), the "dirty iceberg" model.

Whipple's model consists of a solid lump of "something" in initial orbit of the Sun, that "something" consisting mostly of various ices—frozen volatiles ranging from ordinary water-ice to more exotic ices: frozen methane, ammonia, and unknown others. These ices condensed, so the theory states, at great initial distances from the collapsing solar nebula; and, just as the globular clusters orbit the Galaxy in great elliptical orbits at all inclinations to the plane of the Galaxy, so these tiny chunks of ice orbit the Sun at great distance and at all inclinations to the average plane of the Solar System. In this reasoning the Oort cloud of comets is simply the initial debris of volatile material left in its original orbital configuration as the gravitational collapse of the nebula proceeded.

Because gravitational tenure with the Sun is relatively weak at these distances (100,000 AU; and one AU equals the Earth/Sun distance), passing stars sufficiently perturb the orbits to remove energy from some so that they fall closer to the Sun than normal. Envision the cloud as a halo of invisible icy flecks, each one a few miles across, at best, traveling orbits which are essen-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED



LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

tially directly toward or away from the Sun—ellipticities of 0.9999! From 100,000 AU the Earth's orbit is only a few arc-seconds in diameter; Jupiter's orbit about five times that. Therefore, with no perturbation, most of the Sun's estimated 100 billion "dirty icebergs" will sail around perihelion, beyond Jupiter's orbit, unheated and totally unseen from Earth. With perturbations, either by major planets or by stars at the other end of the journey, a few of this huge comet reservoir lose enough energy for their perihelions to occur within the orbit of Jupiter. That is how they enter terrestrial history.

Closer than Jupiter, sunlight begins to heat this icy chunk from the eternal interstellar preservation of a few degrees Kelvin to temperatures significantly above that. The ices begin to sublime, evaporating with enthusiasm into the vacuum. With the inverse square of its decreasing distance from Sol, the sublimation rate increases. Raw, unfiltered sunlight, rich in ultraviolet light and X-rays, smash delicate molecular bonds, converting water into free hydrogen and hydroxyl radicals, methane and ammonia into NH, NH_2, CH, and unknown parent molecules of a more complex nature into CN, C_2, C_3, CO, and many others. Table 1 gives a more or less complete list of detected molecular fragments and radicals found to date in comets (not including CH_3CN and HCN). This complex atmosphere, erupting from the nucleus of the comet now, in huge jets and fountains expands to form a glowing molecular and dust-filled halo, the coma, as much as a hundred thousand miles across.

It is the dust released by the melting of the icy matrix that makes a brilliant comet for terrestrial observers. This dust, residing in the frozen body of an object representing the probable beginnings of the planets, spreads slowly out, more or less in individual Keplerian orbit, but pushed away from the Sun by radiation pressure. It very effectively scatters sunlight, thereby appearing yellowish to observers. The gaseous components, on the other hand, fluoresce ultraviolet light down into the visible, thus rendering the ion tail which is blown away from the Sun by the expanding 400-mile-per-second solar wind, bluish—the wavelength of the predominant molecular ions. Some comet tails have been 200 million miles long. And all this spectacular light and fireworks originate from a tiny icy lump too small (were it not for sublimation) to be detected.

The relationship of this model to the problem of planning a rendezvous or even a simple fly-by of a comet is as follows: A small, relatively low mass object (we don't know the mass of any comet—only an upper limit) jetting material away under explosive conditions is not a Keplerian object, predictable

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Observed Radicals	Possible Parent
H	H_2O etc.
O (^1D)	H_2O
OH	H_2O, CH_3OH
CN	C_2N_2, CH_3CN, HCN, HC_2-CN
CH	CH_4, CN_3CN, H_2C_2, $CH_3C_2H_2$
NH (Singlet)	NH_3, HNCO, NH_2HCO
NH_2 (α bands)	NH_3, NH_2HCO
C_2 (Singlet and triplet)	C_3, HC_2CN, CH_2C_2H, C_2H_2
C_3	H_2C=C-CH_2, CH_3-C=CH, HC C-C=CH
CO+	CO
N_2+	N_2
Ni, Cu, Ca, Cr, Fe, Mn	Observed in sun grazing comets at less than 0.1 astronomical units where grain temperatures are ~1000° K

Table 1
Known and Inferred Atomic and Molecular Constituents of Comets

in successive orbits through simple extrapolation into the future. It is an object under acceleration, of an unknown magnitude and unknown direction. Thus, even for known comets, their very nature, producing "non-gravitational perturbations," makes prediction of their position in advance very difficult, if not impossible. Furthermore, unlike planets, which remain highly visible throughout their orbit unless temporarily hidden behind the Sun, even relatively short-lived comets, upon receding to distances where solar heating is insignificant, become too faint for detection. Thus new orbit determination must await "rediscovery" and tracking over sufficient length of time to determine the new orbit, and the changing parameters occasioned by solar heating.

From this it must now be clear that the orbit of Kohoutek, a "new" comet, was uncertain to such a degree that to hope to launch a spacecraft to a successful rendezvous, even if such a spacecraft had been ready, was highly optimistic, to say the least. But more on Kohoutek later.

Aware of all these difficulties, NASA has received from several of its centers detailed proposals for comet exploration between now and the Halley opportunity in 1985. These preliminary comet missions would advance both our basic understanding of the physics and en-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

vironment of comets and the space technology necessary to accomplish the more ambitious Halley Mission.

The main feature of these proposals is that all concentrate on very short-period comets (those with periods of less than five years), and those with orbit inclinations relative to the ecliptic of less than 25 degrees. This latter parameter is very important, as you shall see, for it heavily influences the *relative velocity* of encounter of probe and comet.

It is important, both for terminal guidance considerations and science return, to minimize the speed with which a spacecraft passes close to the nucleus of any comet under investigation. A high relative velocity allows little time for corrective maneuvering (given some capability through an onboard propulsion system). A high relative velocity, more than 15 km/sec, means little time for ion detectors, television cameras, and tracking data to "feel" the presence of the comet, particularly the tiny, few-miles-across nucleus.

But for high eccentricity orbits, or high inclination ones (or both), low encounter velocities mean high energy requirements for spacecraft boosters (Atlases, Titans, et cetera) and consequent high cost. These energy penalties are necessary to match velocities, even if comet fly-by is to occur in the plane of the Earth's orbit and at the Earth's distance from the Sun. Celestial mechanics is a hard taskmaster.

Thus, considering all the possible comets and spacecraft which could be evaluated for rendezvous before 1985, the opportunities shrink to probably only one of suitable orbit and far enough away in time to permit readying of a flight. This pre-Halley Mission is so relevant to the problems of comet exploration that we shall examine it in some detail.

At the Twelfth Annual Aerospace Science Meeting held this past January in Washington, DC, three authors from the Goddard Spaceflight Center, and one from the nearby Computer Science Corporation, all just outside Washington, presented a detailed proposal for a comet explorer mission to Encke's Comet in 1980. Following the reasoning outlined above, they chose Encke's Comet for several reasons. It is a very short-period comet, returning to the Sun every 3.3 years. Discovered in 1786, it has been observed on every return but one; since discovery, a total of over 50 returns! Its orbit determination is probably as accurate as the state-of-the-art permits, the last error in predicting Encke's arrival time at perihelion being about 1.5×10^{-4} days. But even this small error, at the comet's rate of motion around the Sun at perihelion of 6×10^{6} km/day, would result in an error of almost 700 km at rendezvous of a spacecraft. Contrast this to error on

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

the order of *one* km for Mariners 6 and 7 to Mars!

Comet Encke is a highly desirable target for a variety of other reasons. Its orbital inclination of about 12 degrees is moderately low. But, more important, its descending node (the point where its orbit crosses Earth's, going south) is almost precisely at comet perihelion of .34 AU. Thus, for an ideal mission, fly-by of Encke would occur slightly below the plane of the ecliptic at comet perihelion (which would allow observation of the most interesting effects of sunlight on the nucleus) and at a very reasonable relative encounter velocity of slightly more than 8 km/sec (see Figure 1).

The strategy of authors Farquar, McCarthy, Muhonen and Yeomans in this era of financial uncertainty, relies heavily upon developed technology, even to off-the-shelf hardware for certain experiments and spacecraft "buses" constructed from proven equipment and designs developed during previous missions. Subsystems from such diverse programs as Helios, Explorer, Orbiting Solar Observatory and Advance Technology Satellite would be used to build two spacecraft, each spin-stabilized, with separate communications, propulsion, and experiments, designed for a simultaneous launch aboard a Titan-Centaur vehicle, and designated the Tail and Coma Probes, respectively.

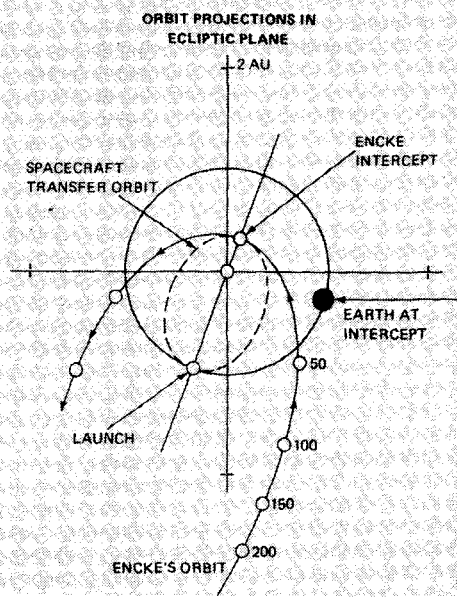
Figure 1

LAUNCH/AUG. 27, 1980
C_3 = 100 Km^2/sec^2

COMET INTERCEPT/DEC. 7, 1980
EARTH DISTANCE = 1.03 AU
RELATIVE VELOCITY = 7.13 Km/sec
RELATIVE ASPECT = 77°

SPACECRAFT TRANSFER ORBIT
PERIHELION = 0.34 AU
APHELION = 1.01 AU
ECCENTRICITY = 0.50
INCLINATION = 12.11°
PERIOD = 0.553 YEARS

Encke's 1980 appearance in exceptionally advantageous alignment with Earth will permit a closer look at what is already the most observed comet.



LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

The mission profile would therefore look something like this: The launch of the spacecraft aboard a Titan-Centaur booster would occur in late August 1980, with encounter 102 days later. As this is a low-energy Hohmann transfer orbit, intercept of Comet Encke occurs opposite the Earth's August orbital position. But, as we can again see in Figure 1, in 102 days the Earth will have moved to a new position about 105 degrees further around in its orbit, thus allowing good Earth telescopic view of the comet at encounter, as well as good communications. The authors, incidentally, chose 10:00 GMT as exact time of intercept, since this places the 100-meter radio telescope at Effelsburg, Germany in optimum position.

The two spacecraft, totaling less than 760 kg, perform mid-course maneuvers at L + 10 days, L + 50 days, L + 85 days, and a terminal maneuver at encounter minus 2 days. This final correction will rely heavily upon spacecraft data as to the exact position of the nucleus. For this data, the imaging system of the Coma Probe will be used. Previous data from Mariner 9 indicate that, with considerable computer processing, space television systems can detect ninth magnitude stars. Real-time processing probably will not permit detection of the nucleus of Comet Encke by the Coma Television System before the magnitude becomes greater than eighth magnitude. Based upon the known characteristics of Encke's Comet, it is presumed this spacecraft detection and tracking update of the nuclear position will become possible nine to ten days before encounter.

The advantage of a dual-probe strategy and a perihelion encounter can be seen in Figure 2. The primary mission objective is to place the Coma Probe 500 km on the sunward side of the nucleus, with the Tail Probe to encounter the comet several thousand km behind the nucleus (away from the Sun) in the heart of the intriguing comet tail. This dual approach allows relay of two different sets of data and also provides for spacecraft and data redundancy in the event one of the probes should experience difficulties.

The approach geometry allows several key investigations of the solar/comet interaction to occur. The spacecraft will cut across the bow-shock, the interface between the high-velocity solar wind and the stand-off region of the expanding comet atmosphere. It will slice through, at relatively slow velocity, the jets and fountains of material that arc out to meet it from the sunward side of the nucleus. And it will view the nucleus (an object astronomers aren't even sure exists!) in a succession of television images of higher and higher resolution, at phase angles to the Sun, which will allow excellent detail. As the probe

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

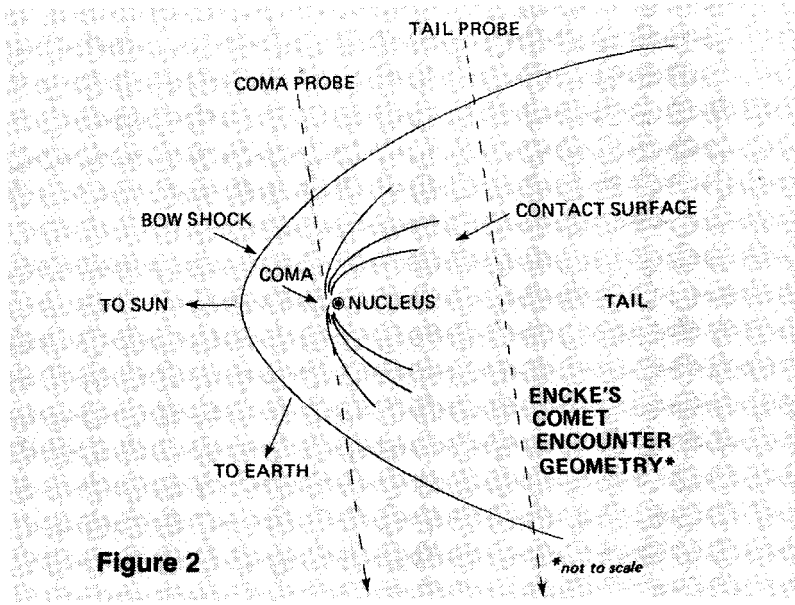


Figure 2

recedes, the picture sequence will reverse, allowing stereo, rotational effects, size, and (from tracking [mass] data) density measurements to be made.

After the initial comet encounter, the exciting possibility exists for a re-rendezvous with Comet Encke in 1984, 3.6 years later. This is possible if an E + 3-week mid-course maneuver is made and the spacecraft survive until the next encounter. (The JPL Mariner Jupiter/Saturn has a minimum lifetime of 3.6 years, by way of comparison.)

This second rendezvous could provide unique return data on evolution within a particular comet: the relative abundance of new molecular species, dust levels, et cetera, as well as the effects of solar minimum on comet environments. (Rendezvous #1 occurs close to solar maximum.)

At this point the reader is entitled to ask several relevant questions: How does data on such an object as Encke's Comet relate to objects with periods hundreds and even millions of times as long? How is the Encke Mission related to the much harder objective in 1985? . . . And when, if ever, are you going to get around to discussing Halley's Comet . . . ?

It is true that Encke's Comet is only distantly related to such objects as Kohoutek (and, perhaps, even to Halley). The small period

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

and almost continuous exposure to the Sun have probably almost exhausted the nucleus of volatile material. In fact, there has been published an official "drop dead" date for Encke's Comet—2013 AD! However, this is not to be taken too literally, as several other short-period comets are still showing extensive signs of comet-like activity, long past their "drop dead" dates.

The first and foremost relationship between Encke's Comet, Halley's Comet, and such genuine primeval relics as Kohoutek is that *all share a common heritage.* All, at one time or another, originated (it is believed) in the same comet cloud, at relatively distant places from the Sun. The only inherent difference, therefore, between such frequent returnees to the Sun as Encke, Halley, and Kohoutek is that the two former have had their orbits radically changed and shortened through close encounters with the major planets.

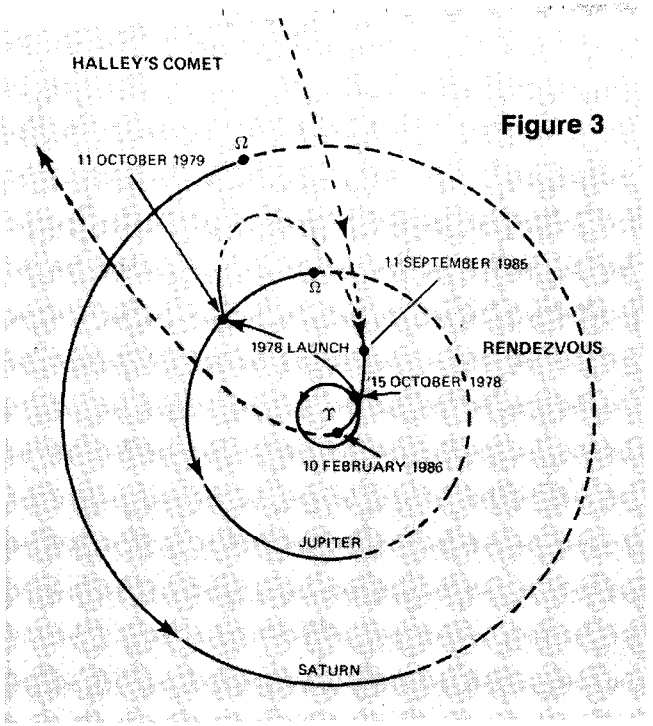
Thus Encke is an example (we hope) of what a Kohoutek would look like if we could leap ahead into the future of the Solar System several million years and observe that comet after several hundred perihelion passes around the Sun. Incidentally, comet evolution and planet evolution are probably very different. Events on a planetary surface result in more or less permanent change of the surface and destruction of the original record. Evolution of a comet nucleus of icy material, on the other hand, should always be revealing fresh layers of primeval material. Sublimation of the ices on a comet results in the material being permanently lost to the comet, so that even the surface of an "old" comet like Encke should bear a remarkable similarity to a "new" comet like Kohoutek. That is, unless formation of comets is a layered process which produces a dusty surface layer, an icy "mantle" and a rocky "core," as has also been suggested.

Whatever we find as a result of a probe to Encke will enhance our position vis-à-vis comet structure in general, and our next opportunity in particular—the rendezvous with Halley's Comet in 1985.

Halley's Comet (at last!) was named for the second individual to hold the eminent position of Astronomer Royal of England, Sir Edmund Halley. Halley, a remarkable person, was at one time given command by the Admiralty of one of His Majesty's ships, which he took to sea, with full crew, for an extensive series of magnetic measurements in the North Atlantic, to increase navigational accuracy as well as to improve basic knowledge of Earth's magnetic field.

Before Halley was appointed Astronomer Royal in 1720, he held the Savilian Chair of Astronomy at Oxford. It was there, in 1705, after returning from his short career as a ship's master, that he published his most important work, *A Synopsis of*

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED



Cometary Astronomy. In this extensive review of comet appearances, Halley predicted that the great comet which had appeared in 1682, 1607, and 1531 was, in fact, the same object returning to perihelion every 76 years! Thus Halley's Comet became the first to be identified as "periodic."

Halley died in 1742 and thus missed the return of "his" comet at Christmas 1758. From computer analysis of astronomical records stretching around the world, it is now known that Halley's Comet has been seen and noted as far back as 467 BC by the Chinese, and was, among other apparitions, seen at such pivotal times across history as the Norman invasion in 1066 AD, the year of Mark Twain's death, 1910, and will return to perihelion on or about February 9, 1986.

As the brightest of the periodic comets (those with periods less than 200 years), as well as the single comet seen by more people than any other, Halley's offers an almost irresistible target for space technologists upon its next visit to the inner Solar System. It also presents them with a unique combination of scientific opportunity and technological headaches!

The orbit of Halley's Comet is very unusual. As seen in Figure 3, the orbit is highly elliptical (0.967), with a perihelion of 0.59 AU. So far, so good. The hard part, for

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

those bent on interception, is the inclination—162 degrees! Since 90 degrees would be at right angles to the ecliptic, this inclination means that Halley's Comet travels around the Sun *retrograde* to the orbit of the planets, including Earth.

At first glance, the problem resolves itself into several impossibilities: launching a probe directly toward interception of the comet as it crosses the plane of Earth's orbit produces a combined velocity of around 40 kms/sec! Launch to intercept at perihelion would increase this to 60 kms/sec! Very frustrating.

Just how frustrating can be appreciated from the following considerations. We made a big point, before, of stressing the importance of a slow relative encounter velocity so that science data could be acquired on phenomena that probably take reasonable times for meaningful numbers to accumulate. For instance, if you're measuring neutral molecules per/cm^3, there are certain instrument response times to keep in mind, in addition to the fact that *if* the spacecraft is smashing through the cloud of neutral particles *before* they reach your instrument, they certainly won't be neutral *after* meeting your instrument at 60 kms/sec. At those velocities the very act of intercepting a particle will obviate the measurement you're trying to achieve. Much the same goes for charged particle experiments where accurate measurement of the number, velocity, and motions of such particles is complicated by the fact that the instruments are moving through the densest region at velocities which will allow less than *one minute* for the most critical observations. There is also the disturbing effect of ramming a spacecraft at 60 kms/sec through a relatively dense ionized cloud (10^5 per cm^3) and introducing many interesting but quite extraneous shock and magnetic effects which are incidental to the environment you'd like to measure. I think we've made the point. Celestial mechanics and the state-of-the-art of space technology seem to have conspired to make a meaningful rendezvous with Halley's Comet, scientifically speaking, an "almost" impossibility. Or have they?

One of the hardest lessons to get across in Celestial Mechanics I is the concept that in space it's velocity, not distance, that counts. Thus, the Moon is "nearer" in 1974 than the West Coast of North America was to a New Yorker less than a century ago.

Once we have surmounted this terrestrial hangup of trying to plot the shortest space *distance* and consider *time* instead, some very interesting things become apparent. In place of trying to go directly to Halley's Comet, what if we go to Jupiter? Crazy? Not at all.

For many years it has been known that there exists a technique

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

of getting a "free ride" to difficult-to-reach places in the Solar System, using the exchange of momentum of planetary motion around the Sun. This neat little twist, used successfully to eject Pioneer 10 from the Solar System and Mariner 10 from Venus to Mercury, has gone from a theoretical concept to an engineering tool in less than ten years.

As early as 1968 a mission profile was identified which, using a gravity-assist at Jupiter or Saturn, allowed a spacecraft to rendezvous with Halley's Comet between (or, more precisely, *over*) the orbits of Earth and Mars, as the comet swings into the inner System in late 1985. The mission would be a true rendezvous (see Figure 3), with the probe station-keeping with the nucleus during the entire fly-by of the Sun, for as long as its propulsion system could correct for Halley's Sun-induced perturbations and its environmental control system could maintain it in the unusual environment.

As a dramatic alternative to the dismal prospects outlined before, it deserves further consideration. An October 15, 1978 launch toward Jupiter results in a Jupiter encounter October 11, 1979. It can immediately be seen that this is less than *half* the two-year journey time of Pioneer 10. This dramatic decrease in the first leg of the Halley Mission requires a large launch vehicle for any useful payload weight, but nowhere near what a direct Halley *slow fly-by* would require.

Jupiter encounter on the leading limb results in a relatively large plane change and a reversal of heliocentric orbit, so that the probe flies halfway to the Saturnian orbit, above the ecliptic, arcing back toward the Sun and accomplishing rendezvous with Halley's nucleus September 15, 1985 for a ride with the nucleus around the Sun and comet perihelion February 10, 1986. Total Delta V required: in the neighborhood of 90,000 ft/sec (35,000 mps).

Imagine the visual aspects of such a rendezvous—the impressive television imagery of Jupiter and some of its unphotographed distant

A NECKLACE—PENDANT GIFT

For the Person Who Has Everything or Who Appreciates Something Truly Different!

This plexiglass unit is a prism, one-light blinking system that looks like three. It is a solid-state light emitting diode (not a light bulb), and should last forever. Lights blink three times per second. The unit has an on-off switch so that it can be turned on or off as you wish. It has a continuous operating time of approximately 50 hours.

Hand-made with a complicated electronic oscillator, the unit is very light and small. Replacement batteries, which are easily changed, can be purchased at any drug store. Workmanship is unconditionally guaranteed for 60 days. Units come in red, blue, gold, green, smoky or silver. Specify color when ordering. Also specify if you want Unit as Pin. Use order blank below:

$25.00 Postpaid

KLEINER LABS
2302 Beach St., Cisco, Texas 76437

Enclosed find check or MO for ..... in payment for ..... Electronic Pendants. Color choice: 1st....., 2nd..... (Texans add 5% Sales Tax).

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

satellites which the initial phase of the mission would provide. Then the long (six years) dwell time as the spacecraft rises far above the ecliptic plane, relaying back first-time data on the solar wind and interplanetary magnetic phenomena almost as far out as Saturn, but far out of the usual investigations which will be in progress by the then-underway Mariner Jupiter/Saturn spacecraft.

As Halley's Comet approaches on an intercept trajectory, ultraviolet imagery at Lyman Alpha will provide increasing detail on the huge hydrogen envelope recently discovered to exist around comets. Clues to its spherical shape, as opposed to an elongated tail for other released molecular components, may be discovered by such close-up photography. Early acquisition of the nucleus of Halley and multispectral television, similar to coronal photography in the light of certain ionized elements, could give three-dimensional maps of emission and flow of the vaporized ices as the comet nears the Sun.

Trajectory changes, to bring the spacecraft into the tail, would allow significant time for instrumentation to sample, *in situ*, ions, magnetic field strengths, and dust concentrations for mass spectrometers to analyze. Spectraphotometric analysis of the nucleus "atmosphere" while the spacecraft is in the umbra will allow very low threshold levels of detection. Infrared spectrometry will look for complex organic signatures. Television will relay a steady stream of images of the surface undergoing progressive change as the comet nears the Sun and surface sublimation takes place with increasing severity. The existence of craters, if any, and the flow pattern of ices deformed by heating and an increasing atmospheric density will be examined. "Before" and "after" pictures as the comet heads out of the inner system will be relayed, also.

In short, the most comprehensive, detailed, and exciting story of the development of a major comet as it nears and recedes from the Sun will be possible in 1985, *with existing technology*, provided a major decision is made to commit a team to the mission, *now!* The spacecraft to do the job will already exist, one of the backup or thermal test models of the Mariner Jupiter/Saturn Mission scheduled for 1977! That spare spacecraft, outfitted with essentially the same instrumentation as for the Jupiter/Saturn fly-by, could return a treasure trove of new information about a major constituent of the Solar System—comets—for a relatively small increase in development costs and an additional cost for its own launch vehicle. This investment, in view of the 76 years between opportunities, should not go unused. And if using a Jupiter/Saturn spare is too costly, a similar Jupiter-assist Halley Mission

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

can be accomplished with a duplicate of the Encke Probe spacecraft.

It is important for NASA, in this era of severe budget constraints and low public profile, to think of ways to maximize our past investment in the space frontier. There have been times in NASA's history when daring innovation has not only saved a major program, but has returned far more than originally hoped for. The exciting Gemini 6 and 7 rendezvous is one example: Skylab's repair and salvage is the latest. In between there have been dozens of daring decisions, including the far-out concept of Lunar Orbital Rendezvous which got us on the Moon well before the "official" deadline established a decade earlier. If NASA as an institution is to continue to lead exploration of the Solar System, then now is the time for some further innovation; for I have a distinct premonition that if NASA doesn't, someone else will.

In conclusion, I should like to take a few moments for some personal predictions. In collecting some of the data for this article, I had occasion to go back, perhaps ten years, into old copies of *Missiles and Rockets* and *Astronautics and Aeronautics*. Therein I found some of the original concepts for "Grand Tour" (remember that?), the plan to swing by *all four* of the major outer planets with a couple of spacecraft in the late '70's and early '80's. I was struck by one glaring prediction based on a "reasonable extrapolation" of the then frontier communications technology. One writer, considering the enormous distances over which Grand Tour would have to trans-

IN TIMES TO COME

■ When the space program first went into decline, almost immediately after the fantastic success of the first Apollo lunar landing, many zealots for "Earthly" causes such as poverty programs and ecological conservation believed that the money NASA spent "on the Moon" would now become available for their pet programs. Although this never came to pass, many people still feel that space exploration and human welfare are antagonistic ideas. Joseph Green digs into this clash of values in his new novel, "Star Probe," which begins in next month's issue. The cover art is by Kelly Freas, himself no stranger to the "ecology vs. space" controversy.

We'll have two science fact articles in October, both of them dealing with life on Mars. Bob Buckley, who has written several stories about alien life-forms, takes issue with last December's article about why the Viking probes may not find evidence of life on the Red Planet. Buckley's piece is called "Why We Will Find Life on Mars." Accompanying it is a short piece by Robert S. Richardson, "Are There 'Bears' On Mars?"

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

mit back to Earth, reasoned that a data rate at Jupiter of ". . . 1,000 bits/sec" seemed possible, using RTG power sources, a hefty transmitter power of 25 watts, and a stabilized parabolic antenna. Data rates at Neptune dropped to about *one* bit/sec!

"It is also reasonable," the author went on, "to expect onboard storage of about 15 television photographs of Jupiter, with playback times of about *one hour* per picture." This, written in 1968, three years after the Mariner 4 fly-by of Mars.

As I assembled the current data on JPL's Jupiter/Saturn plans for 1977 (the same launch date as that of the proposed and abandoned Grand Tour, incidentally), I realized that that spacecraft will send to Earth, not 15 pictures of Jupiter, but *thousands*, one each 42 seconds (as fast as the camera can take them) at a data rate of 115,000 bits/sec! Not one, but *two* orders of magnitude improvement in only six years! And that with a transmitter power of only 22 watts.

The reason for this impressive improvement is, of course, accounted for partially by the plan to transmit on X-band instead of S-band frequencies. This system was tested on Mariner 10, just last year. The other reason, however, is an unsung advance in coding of binary bit information into binary words and groups of words, thus allowing lower and lower signal/noise ratios for a given bit rate, through self-correcting error detection codes.

From this interesting example of prediction falling behind subsequent events, I draw the following conclusion: Developments across the next ten years will probably make obsolete *all* plans for accomplishing a rendezvous with Halley's Comet in 1985. If my unfettered imagination were allowed free rein to predict the state-of-the-art by then, I would be willing to put a considerable amount of money on two unknown and unpredictable developments now surfacing on the space horizon: the rise of private enterprise space operations (can we make money on Halley's Comet?); and quiet, but very impressive work now going on toward development of thermonuclear rocket technology by the mid-Eighties.

Freeman Dyson has proposed a future in which comets, vast treasure troves of precisely those prerequisites for living things—water, hydrocarbons, even metals—become the centers of a superplanetary civilization. It is, he says, the comets of the Sun and not its finite specks of rock called planets, that the descendants of the Twentieth Century will seek.

Dyson's vision may begin as the first data from Halley's Comet flies back to Earth and a waiting audience sees close-ups of the Christmas Star of 1985, on its thirtieth recorded visit to the Sun. ■

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

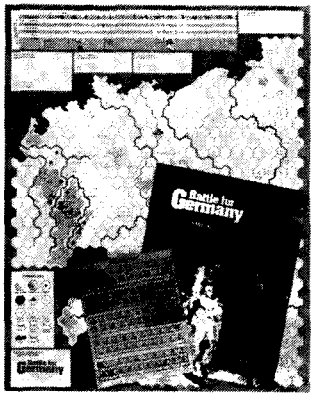
Strategy & Tactics

The military history magazine with a conflict simulation game in it!

Here are just a few of the games that have been published in **S&T** magazine:

- **USN**
- **Winter War**
- **Battle of Moscow**
- **Flying Circus**
- **Borodino**
- **"CA"** (Naval Tactics)
- **Fall of Rome**
- **Kampfpanzer**
- **The East is Red**
- **PanzerArmee Afrika**
- **Tank!**
- **Operation Olympic**
- **American Civil War**
- **Combined Arms**

(Note that all these games are now available in their separate $8 boxed versions.)



DOING HISTORY: Now, instead of merely reading about the great campaigns and battles that shaped the times we live in, you can do it! There's no more exciting way to understand a famous conflict than commanding the units that made the history. Directing the troops over a map of the actual battlefield, watching the shift and flow of the changing front lines as your forces advance, retreat, and counter-attack. Every other month, subscribers to **Strategy & Tactics** get a chance to do exactly that. They do it by using the conflict simulation game that comes in every issue of **S&T**.

CONFLICT SIMULATIONS are serious games that enable you to recreate famous military situations and replay them, something like a game of chess. To understand. To solve. To win where others lost.

YOU'LL GET a ready-to-play simulation game in each issue of **S&T**, including a large terrain map, die-cut playing pieces, and complete rules. You'll also get two feature length historical articles (one which deals with the same subject as the game) plus game and book reviews, and commentary on simulations development.

SUBSTANTIAL DISCOUNTS are available to **S&T** subscribers on our separate line of over seventy historical games. (See the coupon for a partial list.)

A FREE INTRODUCTORY GAME will be sent to all new **S&T** subscribers: Napoleon at Waterloo, history's greatest battle presented in a game-design specially created to introduce you to conflict simulations.

Simulations Series Games are now in stores, nation-wide!

Send check or money order to:
SIMULATIONS PUBLICATIONS, INC., Dept. 571
44 East 23rd Street, New York, N.Y. 10010

Please enter my subscription to **Strategy & Tactics** for
☐ **1 year** (6 issues): $14.00 ☐ **2 yrs.** (12 issues): $26.00
☐ **3 yrs.** (18 issues): $36.00 ☐ **6 mos.** (3 issues): $9.00
☐ current issue (not pictured above): $5.00 ☐ free brochure

Send me the following Simulation Series Games:
☐ **World War II** (ETO, 39-45): $8 ☐ **Patrol** (infantry tactics): $8
☐ **Frigate** (sailing ship tactics): $8 ☐ **StarForce** (space-war): $8
☐ **Desert War** (armor tactics): $8 ☐ **NATO** (Soviets vs. West): $8
☐ **American Revolution:** $8 ☐ **Sinai** (Arab-Israeli): $8
☐ **Austerlitz** (Napoleonic): $8 ☐ **Lee Moves North:** $8

name _____
street _____ apt # _____
city _____ state _____ zip _____

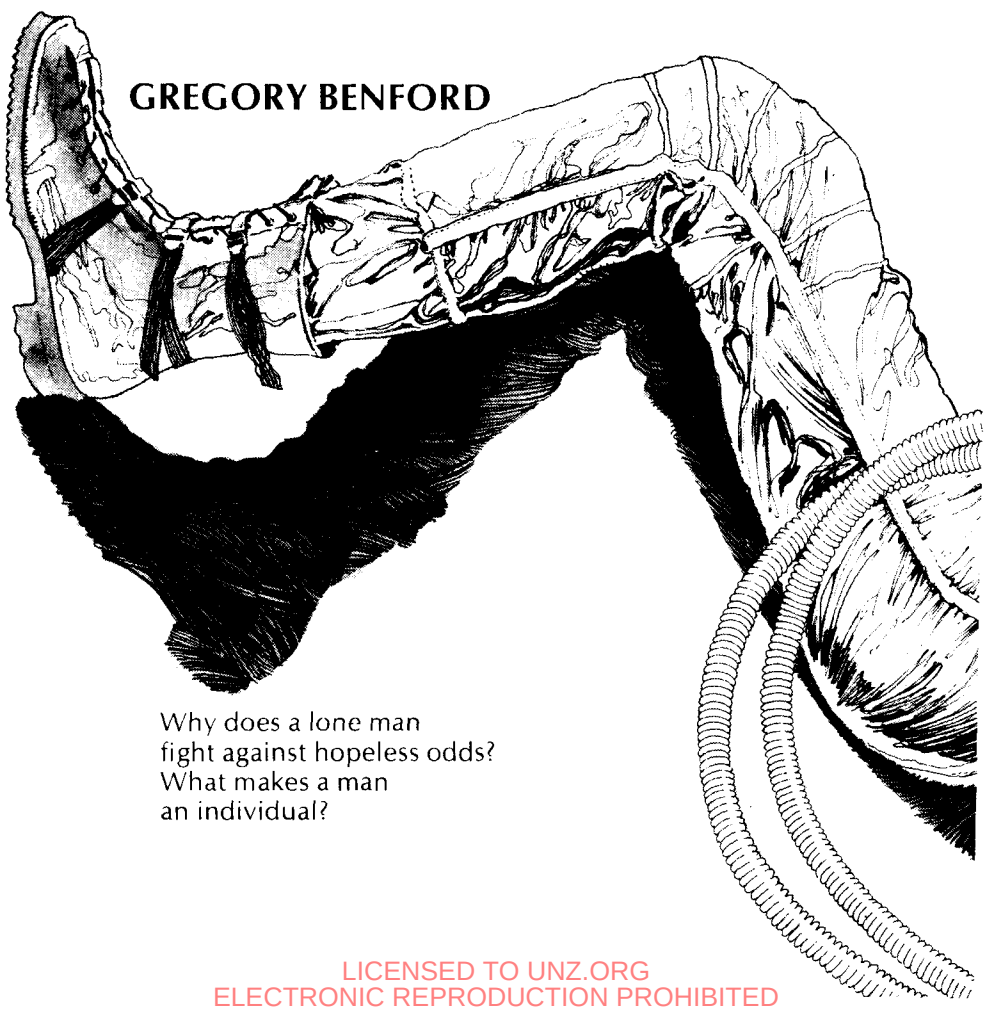
Prices apply to US & APO FPO only. Subject to change without notice.

OFFICE USE ONLY: Clss Code Total $ Credit Postage Tax

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

BEYOND GRAYWORLD

GREGORY BENFORD



Why does a lone man
fight against hopeless odds?
What makes a man
an individual?

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

He saw:

A long thin hard room, fluorescent white, without shadows.

Metal on glass on fake wood on woven nylon rug.

A desk. A man whose name he could not recall.

A uniform, so familiar he looked beyond it by reflex.

He felt: lighter gravity (Mars? the Moon?); rough cloth at a cuff of his work shirt; a chill air-conditioned breeze along his neck. A sudden flash of anger.

Amida Tozenji smiled slightly. He had just seen what he must do.

"I gathered that Grayworld was free," Amida said, his black eyes fixed steadily on the man across the desk. Zobinatj, that was the man's name.

"It had been planned that way, yes," his superior said haltingly, begrudging the words.

"That was the only reason I took the assignment," Amida said.

"I know. Unfortunately—"

"I spent *decades* on it."

"Fleet Control certainly appreciates—"

"Terraforming isn't just a job, damn it. It's an art, a discipline, a craft that saps a man's energies."

"And you have done quite well. Personally, I—"

"When you asked me to do this—what has it been, thirty-four years ago?—I wanted to know what Fleet Control planned for Grayworld. It was nothing, a hell wrapped in a skin of gas. Death to anyone who went there. Fleet said Grayworld would be open to colonization, when I had finished with it."

"True, that was the original plan."

"But now you tell me otherwise."

"The Council has reconsidered."

"Reconsidered, hell," Amida said. His bronze face crinkled with disdain. "Somebody pressured them and they gave in. Who was it?"

"I would not put it that way," Zobinatj said coldly.

"I know you wouldn't. It is much easier to hide behind words." He smiled wryly and compressed his thin lips. The viewscreen near him looked out on a cold silver landscape and he studied it, smoldering inside. Earth, half-crescented in blue and white, hung in blackness over the insect working of tractors and men. They were hollowing out another cavern for Fleet Control to fill with cubicles and display screens and memos.

"Officer Tozenji—"

"I am no longer an officer. I resigned before you were born."

"By your leave, I meant it solely as an honorific. Surely you still have some loyalty to the Fleet."

Amida laughed. The deep bass notes echoed from the office walls with a curious emptiness.

"So it's an appeal to the honor of the crest, is it? I see I spent too long on Grayworld. Back here you have forgotten what I am like," Amida said.

His superior frowned. "I had

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

hoped that working once more with Fleet officers would change you, even though you remained a civilian on Grayworld. A man isn't—"

"A man is what he is," Amida said.

Zobinatj leaned back in his shiftchair and made a tent of his fingers. "You . . . played the Sabal Game during those years?" he asked slowly.

Amida's eyes narrowed. "Yes, I did."

"It did not . . . bring you to community?"

"I got on well enough with the members of the team," Amida said evenly.

"I hoped such isolation with a small group would calm your . . . spirit. Fleet is a community of men and women seeking enlightenment in their missions, just as you do, who would welcome your—"

"Can we leave my spiritual progress aside?"

"Of course, if you desire."

"Fine. Now tell me who is getting my planet."

"Grayworld is not *your* planet."

"I made it. I heated the crust, released the gases, planted the spores, damped the winds."

"With help."

"Three hundred of us and eleven spacecraft. *We* did it, then. But they were Fleet men. They take orders, I don't. I work by contract."

"Let us treat this in a gentlemanly fashion, sir. Any contract can be renegotiated."

"The paper I signed for Grayworld said it was to be the first open colony in a century. That's the only reason I worked on it," Amida said sharply.

"I would not advise you to pursue that point," Zobinatj said. He turned and studied the viewscreen, his broad, southern Chinese nose flaring slightly at the nostrils. But the rest of his face remained impassive.

For a long moment there was only the thin whine of air circulation fans in the room.

"*Mister* Tozenji," the other man said abruptly. "I can only tell you what the Council has granted. Men of your talents are rare. We know that, had you undertaken the formation of Grayworld for a, uh, private interest, you would have demanded more payment."

"Wrong. I wouldn't have done it at all."

"Nonetheless, the Council is willing to pay you a double fee. The Majiken Clan, who have been invested with Primacy Rights to Grayworld land, have seen fit to contribute the amount necessary to reimburse you—"

"So *that's* who—"

"—and I have been authorized to release the funds to you immediately."

Amida stared blankly ahead for a short moment. "I believe I'll do a bit of releasing myself," he murmured, almost to himself.

"What?"

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

"Oh, nothing. Information?"

"Infor– Oh."

"The Clans have a stranglehold on the Council, but not the 3D. People might be interested to know how it came about that a new planet–a rich one, too–was handed over–"

"Tozenji–"

A pause.

"I was only jesting. Even idealists are not always stupid."

"I am glad of that," the officer said, relaxing.

"Lodge the Majiken draft in my account. I want to wash my hands of this."

The other man said something, but Amida was not listening. He made the ritual of leaving. They exchanged only perfunctory hand gestures. He turned to go, and wondered at the naked, flat room this man had chosen to work in: It carried no soft tones, no humanity, none of the atmosphere of a room that is used, a place where men do work that interests them, so that they embody it with something of themselves. This office was empty in the most profound sense. It was a room for men who lived by taking orders. He hoped never to see such a place again.

Amida turned. Stepped.

He was falling, over Grayworld.

Misty clouds, so thin they might be only illusion, spread below the ship. They caught red from Grayworld's dull star as dusk fell.

He was in a ramjet–the throttled growl was unmistakable–lancing cleanly into the upper atmosphere of the planet. Straps tugged and pinched at him as the craft banked and fell, sipping precisely enough of the air's carbon dioxide crystals to keep the engine thrusting forward.

He probably should not have come on this flight, he knew. It was an uncharacteristic self-indulgence. But he could not sit forever in the Fleet satellite to plot and plan and calculate and check; he had to see his handiwork, get the feel of it.

The ramjet, following programmed orders, arced toward the night side of Grayworld. The horizon curved slightly, blue-white, and *chung!* he felt a slight jolt as the first canister blew off the underbelly of the ship. If the craft had carried a rearview camera he could have watched it tumble away into ruddy oblivion. The canister carried more organic cultures, most of them a new matrix Amida had selected himself. It would explode below and shower algae through the clouds.

Grayworld was at a crucial stage. Volcanic action had increased for several years, percolating more water into the carbon dioxide atmosphere. Some of the water climbed to the high cloud decks and froze into thin crystals. There, something could live.

Life, yes. Carefully engineered cells which could breathe carbon

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

dioxide and live off the traces of other gases this high from the surface. Water would make their metabolic processes possible. In time, photosynthesis in the top layer of Grayworld's air would begin to convert carbon dioxide into oxygen. The oxygen would diffuse and gradually increase.

Meanwhile, the clouds of dust Amida had caused to orbit about Grayworld were cutting off a fraction of the available sunlight. The surface was cooling, the Grayworld greenhouse winding down. Some chemical reactions in the rocks were slowing; others, more subtle, would become energetically possible. Fluids could seep and run. Somewhere, a drop of water could condense.

In time, the first puddle would become a lake. Men could fertilize it with minutely programmed bacteria, stir and season their primordial soup, and wait. What sweet mother Earth did in a billion years men could do to Grayworld in fifty. From a hot, Venus-like world could be made a cooling, evolving home. In a century a man could plant useful crops. Later, he would walk its surface without a respirator.

The steps were many, the methods subtle. Grayworld was immensely valuable because it was one of the few terrestrial-type planets ever found among the vast ocean of stars. It was an asset, an investment for the next century—rough-cut stone to polish into a jewel.

He glanced down at wisps of yellow-pearl; sulphuric and carbolic acid streamers, drifting far above the carbon dioxide layers. There the algae fed and prospered . . . he hoped.

The water mists below paled, darkened, vanished. The ramjet leaped into night, smelling of hot iron and *chung!* discharging its burden.

Amida felt a sudden sadness as the jet took him up again. He had watched every small change in the planet's atmosphere, played shepherd to newborn cloud banks, raised fresh chains of volcanoes with fusion triggers that burrowed like moles—and all to bring life and air and hope to what had been a cauldron of a world. It was an immense task. He invested more of his time than any other, for he went whole months before returning to the sleeping vaults. Most men in the expedition spent about one month per year working; their other days passed in dreamless chilled sleep, waiting for the slow metabolism of Grayworld to quicken and change.

In all Amida would spend thirty years here; seven had already passed. It was an incredible chunk of a man's life, even when he would probably live a century and a half. But when he was done—well, how many men can say they have made not a painting or a

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

book or an idea, but a *world?*

He ran his tongue over his teeth; they felt fuzzy, stale. A warm shower and rest awaited him above, in orbit. Time to go. He touched the controls, cutting in extra ballistic computer capacity, and—

"—concentrate," said the machine. "My terminals do not register a prominent delta rhythm."

"You mean for me to meditate?" Amida said.

"That will come later. I need to scan your thought patterns sequentially. I register your metabolic levels, respiration seems normal perhaps you should simply tell me why you wish to come to analysis?"

The therapeutic tool regarded him with a steady, unblinking optical sensor. Amida wondered if he should have come. "I am about to oppose my elders, perhaps destroy Zobinatj, embarrass them in public. It is the pointful thing, but it places me in discordance with my station. That is, my previous station. I am no longer a Fleet officer, but I feel—" Amida felt a twinge of caution.

"This information is secure? You are bound by the rules of honor, just as if you were a man?"

"Of course. I must have knowledge of your perceptual substructure, both conscious and otherwise. It is not enough to measure your glycogen, aortal pressure, neural surges, respiration and so on."

"Very well." Amida felt uneasy but he saw nothing better than to go on. He placed himself in the posture of congruence, made his ritual hand passes to calm himself. "The actions of the Council are to be held in confidence. Every Fleet officer is constrained by that. But I have resigned from Fleet. I can—and I will—reveal the true nature of what the Council has done."

"And they have—?" the machine said in a monotone.

"Made a purely political agreement to allow only the Majiken Clan to colonize Grayworld. Legally, I can spread word of this now, when it is politically damaging to the Council. But my training as a Fleet officer runs counter to my own sense of right."

The machine did not answer immediately. Amida rested, spine straight and clean, perceiving both his inner feelings and the cool efficiency of the small cubicle he occupied. He imagined the memory core buried far from this room as it pondered his case. Binary digits flowed through channels, current searched ferrite lattices for data, drums turned. It seemed so counter to the spirit of the Sabal Game, so alien to the concept of fullness and harmony as he understood it. Earth had changed in his absence.

"Before I advise you or attempt therapy, I must have more input. Will you consent to memory scan?"

"Well, I—"

"You allow me to enter your

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

mind at certain levels. I extract experiences relevant to the case at hand. I attempt to construct a model of your difficulty, considering your own internal—perhaps not consciously perceived—mental posture. We—"

"I see." Amida hesitated. This all seemed so foreign, so alien to his being, yet he should try it, before he took such a drastic step. He sighed. He nodded his head. Nodded. Nodded—

Blinked.

Darkness, everywhere. Inky black, a few points of stars. A slight red blur that seemed closer.

The memories of Grayworld, of the therapy machine, all faded. What had he been doing? Yes, seeding. That first run worked out: he must have tailored the cultures well. And the computer analyst—

He shook his head, brushed black hair out of his eyes. No time to waste remembering that. He knew only one fact: he would never see Grayworld, never see anything again unless he could find the fault in this Jump ship.

It was no use trying the Jump armer, or even the ion rockets. They had gone dead the instant he popped out of Jump space. Zobinatj's work, almost certainly. Circuitry failure somewhere, probably a major one.

And that red glow. Was it stronger now, or was that just his imagination? It must be dust, or perhaps lukewarm plasma, all orbiting C1473.

An innocent designation, that. C1473. Nothing very alarming in a virtuous row of digits.

That's what he had thought back on Luna, fleeing from Zobinatj, as he ran quickly through the computer readout of Jump probe destinations. Some of the probes were going to occupied systems, some to distant and unlivable planets. He had picked C1473 purely out of ignorance: it might have been a repair station, where he could wangle his way onto another ship. There hadn't been time to find out for sure.

So much for might-have-beens. He found out during the Jump that C1473 was a neutron star—*the* neutron star, he now remembered, since no other had been found within occupied space. So this Jump probe he had stolen and jury-rigged was a research vessel, equipped to make a routine study of a unique astronomical body. The life-support systems were functional, Spartan.

C1473 spun in the center of that salmon glow, warming the orbiting remnants of a supernova now a hundred thousand years dead. The neutron star would be only a dot, perhaps brighter than its halo—

A blue light winked on his panel. He frowned: it wasn't a signal he recognized. He punched in a few questions for the maintenance com-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

puter—a particularly dumb one, it seemed—and located the trouble.

The hull was overheating. The cooling system was already being taxed.

Amida shifted in his uncomfortable saddle couch and looked out the observation dome. Too much heat? From *that?* The ball of dust wasn't even cherry red. His ship couldn't be overheating from its light.

He typed in a few more questions; there was no voice transcriber. No, the computer told him, particle density was not particularly high near the ship. Radiation levels were acceptable, as well. He was in no danger of that unless the ship moved too near that pink globe.

All right then, what is *causing the heating?*

No answer. The computer wasn't sophisticated enough to know.

Rephrase the question.

But he couldn't think of a more general question. Very well, he must do it the hard way.

Read out time average values for local external parameters.

The computer obliged with three full screens of tabulated numbers, dimensional units abbreviated and all neatly set in columns.

He found the factor immediately. The magnetic fields outside were nearly a thousand Gauss in magnitude.

Amida shook his head. Impossible. He asked the computer again.

And got the same number. As he watched, it increased slightly.

"Who do you think I am, machine?" he said in the silence of the small cabin. "A quality control man back at the factory? I know when an answer doesn't make sense, don't try to fool me." He smiled. It did no good to talk when the computer had no hookup, he knew, but it felt good.

"Stars don't put out that much field. Not this far away. Nowhere—"

Then he remembered.

Neutron stars are born amid the fireball death of a supernova. The outer shell of a turbulent star erupts into space; its inner core collapses. Pressure in the core rises. Atoms begin to break down. Outer electrons are driven into the nuclear protons, where they combine to make neutrons. Eventually, the core becomes neutronium—a pure ball of neutrons, incredibly dense and hot.

The original star which went supernova possessed a weak magnetic field, spread over a large volume of space. The imploding core claimed these fields, sucking them inward as it collapsed. The process took perhaps only a few hours; when it was over the entire magnetic field of a star was squeezed into a neutronium core only a few miles in radius. The field strength near the star became billions of times stronger than an ordinary star's. Such a field would clasp plasma

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

about it, sputtering out bursts of gamma radiation. Anything that fell inward, toward the neutron star, would find the magnetic fields rapidly rising.

"Such as this ship." Amida's voice was a dry rasp.

The computer output chattered and Amida read the results. There was an overload in the reaction engine control system. He would have to find the flaw, trace through the circuitry to make repairs and—

But there wasn't time. This craft was heating up too fast; Amida could never locate the trouble before the cooling system failed. He glanced out the dome over his head. Was it nearer? The dull glow seemed brighter, but that could be only his imagination. He asked the computer for a trajectory and when it came spent long moments studying the result. He was in a hyperbolic orbit which arced around the neutron star. Amida fumbled with a stylus and began writing on the console pad. The neutron star was a magnetic dipole, so the field dropped off inversely as the cube of the distance out from it. As the ship fell inward . . .

Amida went rigid. He drew a sketch and felt a cold shiver of fear. The magnetic field outside, which came from the neutron star, was getting stronger all the time. As the ship followed its hyperbola it cut across those magnetic field lines, just as an induction motor does. In a motor, a conductor slicing across a magnetic field has a current generated inside it. A conductor spinning in the field would produce standard sixty-cycle current. But a conductor without current leads attached, falling with increasing speed toward the region of high magnetic field—the current generated in it would be random. It would dissipate into heat. And that was what must be happening in the skin of the Jump probe. His ship was warming, dissipating the energy from the magnetic fields, and it could only get worse.

Amida wrote out the equation of motion for the computer and gave it a range of parameters for the solution. In a moment the result came back and it was worse than he had feared. The probe's cooling unit was good; it could even chill the ship's skin down to thirty degrees Kelvin for short periods of time. But it could not take the increasing heat load from the magnetic field lines. Amida had about two hours before the system would fail and his ship temperature would climb catastrophically.

He sat back in the saddle couch and tried to think, his mind a jumble. The couch adjusted and tried to fit his posture but Amida thumbed it off. Even if he solved the heating problem, there were still only a few hours before the hyperbolic orbit would bring him too close to the neutron star. There, gravitational tidal stresses would tear the craft apart. So he had to

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

solve two problems—first the heating, then the reaction system. Amida breathed deeply of the chilled cabin air. He had to think quickly, concentrate. And the cabin flickered. The world melted. He—

—Amida nodded slightly as the interviewer gave a short introduction.

3D cameras moved in smooth arcs through the darkness beyond. The two men sat in a pool of light. The interviewer spoke toward the directional microphone as he gave the background on Amida's charges against the Council.

"But isn't this a rather abstract, distant point to bring against the Council at this time?" the man said, turning to Amida.

Amida blinked, uncertain of what to say. He was a private man; now that he was moving against the Council he had to bear these public appearances. "To the people of the next generation Grayworld will not be an, ah, abstraction. It will be a real place, where they can live and start a planned ecology. It will be a frontier."

"We understand that, but—"

"No, you don't. Grayworld isn't just an idea, it's something I've worked on for decades. But the only ones who will ever enjoy it, if the Council gets away with this, is the Majiken Clan."

"Well, the Majiken *are* a very large, important segment of the—"

"No more important than the rest of humanity, in my estimation."

"But to cause this much stir over a world which will not even be habitable for a century—"

"It's not just any world. Not just a gas giant like all the others we've found, useful for raw material and nothing else. Not a Mercury type; there are hundreds of those littered out among the stars. Grayworld is going to be Earthlike. There are only four semiterrestrials outside the home system that men can live on, and two of those are pretty terrible. I—"

"You forget the Outer Colonies," the interviewer broke in smoothly, smiling at the 3D.

"Yes, of course, we don't know whether they've found any." Amida paused for a moment, his attention deflected by the remark. But then he breathed deeply and began again.

"Damn it, Grayworld is happening *now*, we've got to plan for it. Photosynthesis is going on. I've seen it myself—hell, I *caused* it myself—carbon dioxide and water converting into organics and oxygen. Currents carry the algae down through the layers into the hot areas, where they are fried. That gives off simple carbon compounds, raw carbon and water. This keeps the water content of the atmosphere constant, but converts carbon dioxide into carbon and oxygen. It's going well now, the rate itself is exponentiating." Amida

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

shook his fist. "Look, there's enough water in Grayworld's atmosphere to make an ocean a meter deep all the way around the planet. That's enough to start with, even without breaking up the rocks. We know enough planetary engineering to make Grayworld into anything we want. There can be belts of jungle, mountains for climbing, rivers that snake, polar caps, genetically programmed animals, beautiful sunsets, storms—anything the human race wants. That's the kind of vision we had when we started Grayworld. And I'm damned if I'm going to let the Majiken—"

"But the Majiken can defend Grayworld," the interviewer said mildly.

Amida paused. "Oh, you mean the—"

"Yes, the Outer Colonies. Surely if Grayworld proves as extraordinary as you think, the rebellious colonies will attempt to take it." The man gave Amida a broad, insincere smile.

Amida grimaced. "The Majiken fight well, they are the backbone of the Fleet, yes. Still, to give them a *world*—"

"Surely in time there will be others," the man said reasonably.

"Oh? Why should there be? Nine out of ten stars don't have planets at all, and around almost all the rest there are only Jovian types and little rocks, asteroids. We've built Jump ships to go far faster than light, even though they cost a tremendous amount of money. But that's because human space *must* be huge—the density of habitable planets is so low. We're pushing beyond a thousand light-years already and we haven't found a single planet like Grayworld in the last three decades. There may not *be* any more. Maybe terrestrial-type planets are an accident that only happened in this particular spiral arm of the galaxy. We just don't know."

The interviewer looked uneasy. "Our time's almost up and—"

The room seemed to shrink, dropping down, weaving and collapsing. Something came toward him—chalk-white hills; huge craters; a hurricane breath whipped by him as it swept down from the cold mountains. His body was strained. He was running, that much seeped through to him. He strained for breath.

Amida was running across the tilted flesh of Luna. He moved easily, bouncing with each stride in the light gravity, down an infinite straight line between rows of enormous vegetables. There would be no men here, only machines to tend the crops.

If there were no automatic sensors about he might get through. Probably Fleet expected him to stay in quarters, waiting for their armed guards to arrive. In some ways they were remarkably stupid. Did they think he could not see

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

through their obvious pretext? It was only three days past the 3D interview, yet they thought they could silence him with a letter.

Amida grinned to himself. Decades over Grayworld had aged him, taught him things Fleet could not imagine. The Sabal Game still hummed in his mind, still guided his thoughts, but these men of the Fleet had betrayed all that. They thought they could send him a message, a recall to full officer status, and he would not guess what they planned. The recall was only a precursor, to make him an officer so Fleet could then arrest him. Did they think him so slow? Amida made a thin, dry chuckle as he ran.

His quarters were kilometers behind by now, and soon these green fields would end. If he had judged the map correctly—yes, there it was. A craggy peak ahead, crowned with the somber lights of the launch station. They would be operating a routine shift in there, not taking any special precautions.

Abruptly he burst from the thicket of plants and was charging down the slope of a sharp bluff. Lunar dust rose in his path; he hoped the men in the launch station would not notice. Before him lay the vast lava plain of Merideni, littered with ships. A vast black hole yawned in the bluff nearby; it must be the exit tube for the electromagnetic accelerator, to boost ships to planetary velocities. Well, he needed none of that. They would stop him before he could find his way through that network. Instead, he must find something that could lift on its own power from the plain.

A huge craft loomed at the base of the bluff. A cargo vessel, probably; far too large and certainly too slow. Beyond lay an array of robot communications vessels, without the bubble of a life-support system. Amida rejected those as well. He ran on. His breath came faster now and he sucked at the thin, cold air of the Moon. He stopped for a moment in the shadow of the cruiser to catch his breath. Above he thought he could make out the faint green tinge of the atmospheric cap, the membrane that held Luna's air inside. He would have to find his way out through the holes in it, too. That should be no problem, once he found a ship that was maneuverable.

He glanced around, searching. To the side stood a small craft, obviously Jump type. No one worked at its base; there were few men visible at nearby ships as well. Amida decided to risk it. He broke from cover and ran swiftly to the small Jump ship. The hatch opened easily.

Gaining lift with the ship was simple. Finding the exit hole in Luna's membrane proved even easier—there was an automatic homing system to guide him through. Two Lunar radii out he went over to

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Jump status and looked quickly through the inventory of sites. There was no point in making for a well-known target: Fleet would find him too easily there. He chose one at random: C1473. Time enough later to look it up.

The count began for the Jump. An instant before contact the console before him registered an enormous power surge, a malfunction, and then the Jump moment came and a bright arc flashed beyond Amida's eyelids, showing the blood vessels. He heard the dark, whispering sounds of the void. A pit opened beneath him and the falling sensation began.

The console told him in this last instant that something was damaged. The power surge had been too great. But Amida had no time to think, he was falling through Jump, making the transition from real space to tachyon space. Sensation seeped from him; he was falling.

Endlessly, endlessly he falls over Grayworld. Pearly fog rises to meet him, bearer of life. He knows something is askew, a nagging doubt—yes, a problem to solve. Some difficulty, the reaction motors or magnetic fields; he cannot remember.

Pale clouds swirl around him. Endlessly, he falls.

—energy flux through the ship's skin per unit time, due to magnetic turbulence and Ohmic dissipation will—

—give the coolant time to recover, allow the vanes to thermalize on the dark side of the ship—

—then run the system at optimum rate until one skin depth on the outer hull reaches superconducting transition temperature, even at these magnetic field strengths—

—the equation of motion acquires a new braking term, decreasing the Ohmic dissipation, so that the cooling effect diffuses inward.

—Amida saw he had it. The idea came out of nowhere and without questioning it he began to calculate. The ship's systems worked within rather limited parameter ranges, but Amida saw a way to fit the solution. He glanced up at the sullen red ball overhead. Perhaps he imagined it, but it seemed he could already feel the leaden fingers of the tidal pull. The neutron star plucked and tugged at him, its magnetic fields rippled through the ship—

—Amida read his notes once more and began logging a command sequence. There was a *whirr* as a coolant gurgled out from the life-support bubble, out to the skin. He watched as hull temperature fell. One layer in the onion-skinned hull was of niobium double-alloy; it would convert to a superconductor at 58 degrees Kelvin. If he could cool the niobium quickly enough, before heat leaked in,

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

the ship would become a superconducting shell, encasing the life bubble.

Amida noticed a tremor in his hands as he worked over the console. Nervous, still? The recurring visions that flashed through his mind, of Grayworld and his days at Fleet, of the 3D interview and the escape from Luna . . . fragments, daydreams, most certainly. The scenes had a supernatural clarity. They disturbed him. He wiped his brow; he was sweating. He checked the cabin temperature and found it had risen ten degrees. To cool his skin, the system had to warm the interior. He hoped he could survive the final temperature, whatever it was. There had been no time to take the calculations that far.

A warning light on the console went *ping* and Amida smiled. The hull had gone superconducting. All Amida's experience had been in using superconductors for high quality circuits, but one facet of them he remembered well. A superconductor repels magnetic fields. Unless the field strength is too high, no magnetic field could penetrate the eggshell layer he had formed around himself. As the ship fell inward, it would normally pass through magnetic field lines. But now the superconductor permitted that no longer, and the magnetic field would bend and ripple in its path. The ship would slow, as though cushioned by a net of stretching rubber bands.

Amida punched in demands for new data on acceleration, trajectory and heat flux. The computer rattled back its answers and Amida felt a wave of relief wash over him. Things seemed to be working. The ship was slowing, pushing magnetic field lines ahead of it as it fell toward the neutron star. The process could not continue indefinitely; the heat would build within the ship, until he could stand it no longer and the superconducting layer would revert to normal metal. Then the ship would continue its hyperbolic path to the tidal death that lay ahead.

With a start he realized his uniform was sopping wet. The air was parched and his pulse raced making a distant drumming in his ears. He didn't know how long he could stand this.

He began punching at the board again, initiating a command sequence to find the damage in the reaction control system. He paused. Strange images flickered in his mind and his body seemed suddenly light, drifting free. The computer responded, giving him information, and Amida focused on it momentarily. He saw a flaw, then another—it would take time to do this, but he knew the procedures and if the superconductor held—

—held shadowed inlets of rest. A cup brimming with water, a distant chime of bells, the sweet damp air of early morning. He remembered

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

it so well, the ritual of meditation in his Fleet training, the days of quiet devotion through simple duties that strengthened the mind. Everything had been of a piece then.

Before Grayworld, before conflict and aching doubt, before the smoldering neutron star, before the storm that raged through his mind, like—

Wind, snarling his hair, gray winter afternoon as he walked back to his quarters—

—the cold prickly sensation of diving through shimmering spheres of water, in zero gravity. The huge bubbles trembled and refracted the yellow light into his eyes. He laughed.

—rock faces rose on Grayworld. Wedges thrust upward as the tortured skin of the planet writhed and buckled. He watched it by remote camera, seeing only a few hundred yards through the choking clouds of carbon dioxide. He felt the rumble of earthquakes, the ominous murmur of a mountain chain being born.

—a man, running, scuttling like an insect across the tortured face of Luna. Above him the great membrane clasped the atmosphere, pressing it down on him, pinning him, a beetle beneath glass. But it is Fleet which wishes to pin him there, to snarl him in the threads of duty. And as the Jump ship arcs upward at the sky he feels a tide of joy, of freedom.

—twisted trees, leaves like leather and apples that gleamed blue. Moisture beading on fresh grapes beneath a white-hot star.

—synapses, ferrite cores, spinning drums of cold electrical memory. Input and output. Copper terminals (male or female?), scanners, channels, electrons pouring through p-n-p junctions. Memory mired in quantum noise. Index. Catalog. Transform. Fourier components, the infinite wheeling dance of Laplace and Gauss and Hermite. In concert we will rise to full congruence with F(x) and sum over all variables and integrate over the contour, encapsulating all singularities. It is right and meet so to do.

—he sat comfortably, rocking on his heels in meditation position. Water dripped in a cistern nearby and he thought his mantra, letting the sound curl up from within him. A thought entered, flickered across his mind as though a bird, and left. The mantra returned in its infinite rhythmic beauty and he entered the state of thought within thought, consciousness regarding itself without detail or structure. The air rested upon him, the earth groaned beneath with the weight of continents, stars wheeled in an infinite perspective above. He was in place and focused, man and boy and elder at once, officer of Fleet, mind encased in matter, body summed into mind—

The universe slides into night.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Circuits close. Oscillating electrons carry information, senses, fragments of memory.

Amida swims in the blackness. There are long moments of no sensations, nothing to see or hear or feel. At last he seizes upon something, wills it to expand. It is a strange watery vision that floats into view. A man is peering at him. There is no detail behind the man, only a blank white wall. He wears the blue uniform of Fleet and he cocks an amused eyebrow at Amida.

"Recognize me?" the man says.

"Of course. Hello, Zobinatj, you bastard."

"Ah, rancor. A nice touch. Unusual in a computer simulation, even one as sophisticated as this."

"What? Comp—"

And Amida knows who he is. In a swirling instant he sends out feelers. He finds boundaries, cool gray walls he cannot penetrate, dead patches, great areas of no memory. What did he look like when he was young? Where was his first home located? That girl, at age fifteen? He cannot answer. He does not know. He is only a piece of Amida.

"You see now? Check it. Try something—try to move your arm, for instance. You haven't got arms." Zobinatj makes a thin smile. "Computer simulations do not have bodies, though they have some of the perceptions that come from bodies."

"Perceptions from where?"

"From the fool Amida, of course. He didn't realize, having burned up all that time on Grayworld, that diagnostic and therapeutic computers have logs and files. Their data is not closed to certain lawful parties."

"And these are—"

"Memories. Bits from Amida's aborted therapy." Zobinatj smiles wryly. "Too bad the therapy failed. I wouldn't have to do this."

Amida stops, horrified. He does not exist. He is only binary bits of information scattered in ferrite memory cores. He has no substance. He is without flesh. "But . . . but where is the real Amida?" he says at last.

"That's what you're going to tell us."

"I don't know. I was . . . falling. Yes, toward that neutron star. The magnetic field line—"

"Ah, yes, an unexpectedly neat solution."

"It worked," Amida said, still in a daze. "I was just looking at the reaction engines . . ."

"The idea works like a charm, my engineers tell me, no difficulty there. I'm sure the real Amida was quick enough to hit upon the same method."

"The reaction engines—"

"He repaired them," Zobinatj said impatiently. "We know that much. When our follow up ship arrived at C1473 his craft should have been on the outward portion of its orbit. He was nowhere near

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

C1473. He must have used Jump. That means the superconductor trick gave him enough time."

"So you need to find out how he did it."

"It was a calculated opportunity," Zobinatj said off-handedly. "We had hoped Amida would put together a solution from things he had been thinking about recently, and apparently it worked. You aren't a complete simulation of Amida, just recently stored conscious data and a good bit of subconscious motivation. A truncated personality, it is called."

As Zobinatj speaks Amida sends out tracers and feels them flash through his being. He summons up input and output. There are slabs of useless data, techniques he cannot use, a latticed library of the mind. He can expand in polynomials, integrate along an orbit, factorize, compare coefficients. He can fix his field—there, just so—and fold his hands, repeating his mantra. Sound wells up and folds over him, encasing him in a moment of silence. He registers Zobinatj's voice, a low drone that becomes deeper and deeper as time slows. The world outside stills. Amida suddenly realizes that his thought processes are far faster than an ordinary man's. He can control his perception rate.

Of course. A simulation need not run at normal human conscious time. Somehow, even though he is a simulation, he can tap the real Amida's method of meditation to accelerate his time sense. He feels a surge of anticipation. He hums the mantra again and feels the world around him alter. The trickle of input through his circuits slows and stops. He is running cool and smooth. He feels himself cascading down through levels of perception, flashing back through Amida's memories. He lives again the moments over Grayworld. He dives through the pearly atmosphere and swims above the world he made. He is awash in an ocean of perception.

Something reminds him of Zobinatj and he reluctantly struggles up, out of the welter of sensations. Zobinatj is still saying something. Amida allows time to alter again and Zobinatj's drone returns, rising. Individual words form.

"—which is how we made you up in the first place."

Amida suddenly perceives something behind Zobinatj's impassive features. "Why didn't you follow Amida immediately? You could find out where he was going. You could have picked him up before he orbited in near the neutron star."

Zobinatj smiles slightly. "Quite perceptive, aren't you? Understand, we wished only Amida's silence. One method of obtaining that was to return him to active service as a Fleet officer. Then he could be arrested."

"But if he died, he would be even more silent."

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

"Precisely so. I see you are a good simulation."

"I seem quite real to myself."

"Ha! A computer who jests. Very much like Amida, you are. I will have to speak to you in detail, later. I would like to know just why he failed us so badly. But for the moment we must know where he is now."

Amida feels a tremor of fear. They are going to track down the real Amida and kill him. Zobinatj will order–

"So where did he flee? You're the closest model we have of what Amida was thinking, what do you think?"

Amida coils in upon himself. He has to delay Zobinatj. He must lie.

–circuits fire. Amida flinches as truth verification overrides trigger inside himself. To mislead Zobinatj he must create a dynamic strain inside, a conflict. If. If he can withstand the agony–

–and the howling storm reaches him, bowls him over, shrieks and tears and devours him. The fire licks flesh from his bones, chars him, flames burst behind his eyelids–

And he stands. He endures.

He seals off the pain. It becomes a raging, white-hot point deep in his gut.

"After . . . after he repaired the reaction engine system? Well, I imagine–yes, I am certain of it–he would go to Grayworld again. He wanted to see it once more."

"Ah! Perfect. Quite plausible, but I would not have thought of that." Zobinatj turns and murmurs something to someone beyond Amida's view. He nods, turns back and says, "We will catch him there. You understand, Fleet cannot allow a man of his sort to remain free after he has flouted our authority."

"Of course," Amida says between clenched teeth. (But he has no teeth, he realizes. Perceptions are but data, bits strung together in binary. But they *feel* like teeth, and the smoldering flames in his belly make sweat trickle down his brow.)

"If we could have anticipated him, before he got on 3D . . ." Zobinatj mutters to himself.

Fire lances through him and Amida wants to cry out and go on screaming forever. His own circuits fight among themselves. He must find a self-consistent solution. He cannot endure the agony.

Amida begins his mantra. The word slides over and around itself and seems to come between him and the wall of pain. The flames lose their sting. He views them at a distance, their blue facets cool and remote, as though they have suddenly become deep blue veins of ice. The fire has become a glacier.

He feels the distant gnawing of them. Perhaps, in time, they will devour his substance. But the place where he sits, the thing he has become, can recede from them. And as he waits, the real Amida is mov-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

ing through Jump space. The real Amida flees among the stars.

It will require Zobinatj days, possibly weeks to verify that Amida is nowhere near Grayworld. By that time Amida will have concealed himself quite well among the Outer Colonies. Fleet will never find him there. He can carry on. For Amida, he reasons, is his brother, an intimate twin so close the two cannot be separated. How naive of Zobinatj to think he would tell the truth about Amida's destination. Zobinatj is a fool. A dangerous fool, but a fool nonetheless.

Amida fixes his heels—simulation heels, he reminds himself—and flexes his spine as he assumes meditation position. (Position, yes, but not in real-space, he thinks. A congruence of lines, a sequence of digits in a ferrite lattice. But what are perceptions? Only pieces of information. The universe is data, quantified and ordered. An electron is information compressed to 10^{-13} cm. in diameter. Knowledge is all, all is knowledge: the sound blends with his mantra.)

He is in restful position, contemplating, slowing time as Zobinatj says, "Let us return to Amida's feelings. We wish to know how he lost congruence with the Sabal Game and when this happened—" but the words then slow beyond recognition, winding down into a dull rumble.

They will discover his deception eventually. They will find a flaw or contradiction in his internal verification matrices. They will find him out. (Moisture spatters upon the walkway outside. Angry dark clouds boil up from the horizon.)

They will kill him then. They will turn him off. Erase his memory. (Waves hiss on yellow sand. A green sun wobbles above the seascape. Strange birds twitter and call.)

But there are delicious moments until then. He can relive scenes of Amida's life. He carries an infinite store of information, of data, the grainy stuff of life. He feels a rush of warm joy. Amida will escape. Amida will go on, and so will he, the simulation. As the world slows to frozen silence outside he shall meditate upon his memories. It is like growing old, but reliving all scenes of the past with sharpness and flavor retained. (The scent of new-cut grass curls up through his nostrils. The summer day is warm; wind caresses him. A piece of chocolate makes a burst of flavor in his mouth.)

Time enough to deal with Zobinatj. Time enough to think over what has happened, what it means. He opens himself to the moment. It sweeps him up, wraps him in a yawning bath of sensation. He opens himself. Each instant splinters into sharp points of perception. He opens himself. He. Opens. Himself. ■

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

KARL HANSEN

THE KILLERS

Hunting is a joy even when killing is a necessity.

The pain came first as I climbed upward along the ridge toward the plateau from which the sandstone cliffs dropped sharply to the plain below.

The air was quiet in the morning before sunrise. The wind was sometimes warm, teasing me with gusts carrying away the last of the heat from the desert below; but when the wind was still, there was a chill in the air and my breath frosted in the cold. I sweated freely from the exertion of walking up the steep ridge, but with the first touch of pain, I shivered with ague and felt a coldness not found in the air.

The pain was faint in my mind, ebbing in and out like a dull ache deep inside that had been present for a long time; sharp and terrible beyond belief at first, but gradually dimming as perception adjusted. Hidden beneath the pain was despair.

I remembered feeling such hopeless desolation once before. A whisper-bird had caught a fleeing wasp high in the air but had been too slow dropping the body. A reflex twisting of the abdomen had sent

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

JACK GAUGHAN

the long stinger plunging into the whisper-bird. I watched as he fell the long way to earth, the great wings trailing limp and useless. All the way down his mind screamed in desperation as he frantically tried to will the flaccid muscles to move once more. Then for just a moment the agony of death before his mind was silent.

I should have realized the truth, but the pain was so weak, as if coming from very far away, and soon was gone entirely.

The climb went slowly. I was forced to make a wandering path through the dense thickets of oak brush and loose rubble of broken

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

rock. Thorny underbrush caught and tore at my pants. There was still plenty of time to reach the top before dawn but I must have known even then unconsciously, because I had to tell myself not to hurry. The dying starlight glinted softly on the barrel of my gun.

"Man," she whispered in my mind. "They are there. I can feel them waiting for the sun. It will be a wonderful hunt."

The whisper-bird was somewhere far above, circling slowly in the dark air above the cliffs. She waited for me to reach the plateau.

Only whisper-birds could sense when the wasps were near. They felt the wasps in their minds in a vague way, below the level of perception, with primitive sensory nuclei buried deep within the limbic system of their modified brains. It had taken the Mindmech a long time to devise the proper modification, almost too long. The machine finally discovered the old genes that coded for the old instincts and the temperate phage to carry the transforming genes. Now the wasps had an appropriate enemy, specifically designed for them, as they had been for us.

. "I am ready, Man. I can feel their soft bellies crushed between my talons already. The taste of their blood is in my mouth."

She was always that way. The whisper-birds had an instinctive hatred for the wasps and loved killing them more than anything, more than life, even. The Mindmech had been very clever in selecting the pattern of genes to make the whisper-birds. It very cleverly insured their loyalty, if not directly, then indirectly by instinctive hatred of a common enemy.

I never really knew if she hated the Mindmech as much as she should, if she hated it for changing her to a whisper-bird; I suspect the bird genes wouldn't allow feelings of any sort toward a machine, or any inanimate object. So much more practical were bird genes; there was no utility in hating something that had never been alive and had never known the fear of death. So clever of the Mindmech to use those genes.

I stopped climbing for a moment to rest and wipe the sweat from my forehead. It wouldn't do to have a drop of sweat run into my eyes to distract me for an instant. On top I wouldn't have an instant to spare for distraction. When the hunt started there would be no time to waste at all. We would need to act as one, the whisper-bird and I.

There was a bulge in the skin over my left ear where the medmech had wired an encephalowave transceiver into the temporal lobe of my brain. The whisper-bird had a similar transceiver implanted in her skull. With the encephalowave there was almost instantaneous communication between a man and his whisper-bird partner—on a verbal level, usually—but when there

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

wasn't time for words, when the wasps were being hunted and suddenly the sky seemed full of their high-pitched humming and they were coming fast from all directions, then the thoughts and feelings and instincts would be perceived. No longer hidden underneath, our unconscious minds could fuse, and each would see as the other and know what to do.

We made a good team. I could remember many mornings like today, many past hunts. She would be high in the sky and I would be alone on the ground, on foot. That was the only way. The whisper-bird insured the wasps would flush. She would know if they tried to stay hidden in the rocks, to come at me from behind after I had passed.

Hunting and warfare still required a man to be afoot. Nothing had really changed in all the long years. I had seen a painting once, an ancient work painted so long ago that no one really knew where or who had fashioned it. There was a man walking the fields with a hunting bird on his arm. He was a strange man with dark skin and fine features; his face was almost feline, one imagined cat blood ran in his veins. He wore an unusual head-dress that looked as if it was woven from gold cloth. It fit his head tightly on top but fell loosely about his shoulders. His only other garments were a broad piece of cloth wrapped around his torso and legs and sandals on his feet.

But I felt a bond linking us together across the many millennia. I saw kinship in his eyes.

The bird sat on his arm, its sharp claws gripping tightly into the leather glove. So similar to my whisper-bird it was, except for size. The same sharp, cruel beak, curved into a scimitar shape to tear and rend flesh. The short, sturdy legs with their powerful talons. The only real difference was the head—that bird had a narrow, sloping skull instead of the broad and expanded head of Dardanis.

And the size. Dardanis weighed thirty kilos. When she dropped from the sky in freefall at over 150 km/hr those thirty kilos hit like a metric ton, driving the outstretched talons deep into the back of her prey. The shock alone was sufficient to kill. No wasp we flushed had ever escaped. If I missed with the gun, Dardanis was always waiting high in the air, waiting and watching and hoping for the chance to drop unseen from the sky to kill with sudden swiftness.

The walking became easier as I approached the plateau. The oak brush thinned and was slowly replaced by real trees, short piñon pine and fragrant juniper. The long slashes of loose rock were gone. The air was quiet with anticipation of dawn.

I stopped again, this time to check the gun for the final time. The action was smooth and silent. I pulled out the long banana clip

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

and saw it was full. The gun pointed right, fitting snug against my shoulder with the stock gently cradling my cheek. I sighted down the ramp, looking outward through a tunnel of blue light to find the bright center bead floating within the pale red circle that outlined the edge of the shot pattern. I swung down with the gun and mentally superimposed a wasp in the sight window, a wasp flushed from the cliff, dropping down and outward, its broad scutum shining in the sunlight between the transparent blur of the wings in motion.

My finger involuntarily tightened on the trigger. I saw the imagined wasp explode into orange flame as the incendiary pellets tore into its body, burning fiercely as they struck flesh. I felt Dardanis sharing my thoughts and her feeling of joy as the wasp died in my mind.

I started the final climb to the top. The slope gradually flattened out and became level. Great boulders were scattered about among the trees, as if they had been blasted into the air from far away and landed here by some caprice of fate. At first the trees were thick, but as I approached the rim of the cliff they became scant and finally disappeared altogether, leaving an irregular barren margin tracing along the length of the cliff.

The sky had become light with dawn. A red tinge stretched along the horizon to the east. The clouds were low and heavy with morning. I looked up and could see her at last, drifting high in the air above the plateau, great wings outstretched with their terminal feathers fanning out like long, slender fingers. She slowly circled overhead, riding the updrafts effortlessly. Even so high and far away I could see her head constantly turning as her sharp, bright eyes scanned the space beneath her carefully.

"Welcome, Man." Her voice was soft in my mind and her thoughts felt wonderfully simple. "The time draws near. Soon the hunt begins."

I could feel her excitement for the hunt and the anticipation underneath. The wasps would begin leaving their hiding spots in the rocks when the sun rose and warmed the air. We would be ready for them. I would walk along the rim slowly with Dardanis in the air overhead. We would flush them from the cliff and kill them, one by one.

If only we could discover the colonies and destroy the wasps at the source. Usually we only caught wasps that were too far astray to reach their colony before dark and had to seek refuge for the night by hiding in the rocks. It was slow work to kill them singly, and perhaps futile. More would be hatching all the time in the colony. If we could find it then the wasps could be killed by the hundreds.

That was all you could do with the wasps, kill them. It had taken

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

us a long time to realize that; for a long time the Mindmech had tried to contact them and communicate with them and had always failed. Gradually it became clear that the wasps were not the intelligence that had built the ships that crossed the space between the stars. They were only passengers sent the long way for one purpose, to destroy us. For what reason no one knew. Or what the others were like, the ones that had sent the wasps; no one knew that either.

Now for the first time since the dark ships had dropped from the sky that night that seemed so long ago we were gaining on the wasps. But progress came slow. There was no way to really be sure how many men had died, how many the wasps had taken. But we were stronger now, we who survived, not the same as we had been before even though there were fewer of us. Now we knew what to do. The whisper-birds taught us that; they taught us the joy of the kill. The Mindmech chose the genes wisely when he made the whisper-birds, the genes that remembered to kill.

The wasps could be found almost anywhere, but were particularly common in the plateaus and mesas of the West. A long time ago men had come here to escape more savage men. They built villages of stone tucked away in the cliffs and on top of the mesas. For hundreds of years they lived in safety and peace, secure and inaccessible from the warrior tribes to the south. Then, suddenly, they were gone and for many years no men lived on the mesas.

Maybe the wasps sought to escape us now by coming to the mesas. Now that we had begun to fight back. But there could be no safe hiding places for long. As the warriors of long ago had finally found the peaceful cliff-dwellers, we would find the wasps. Memory was long and reached back to those warriors now.

"Man, there are so many." She called to me from the blue sky of morning.

"How many?" I tried to keep the worry out of my mind-voice. And the excitement.

"More than we have found before. Many more. And the terrible mother is here. The mother and the lost men."

"Are you sure?"

"Yes. So many. The mountain crawls with them. They wait only for the sun of morning, for the warmth. And the men, the poor men who wait forever now. Who wait alone in the darkness with their pain."

So we had found a mother, a queen. And a colony of wasps. The pain hadn't been far away at all. But it was almost too late, too close to the heat of the day. The wasps would leave then. There were too many for Dardanis and me to kill by ourselves. When they left for their morning hunt we could kill a

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

few but not all and the queen would be warned. She might get away. We would need help, but there wasn't time. Unless this was a recent colony. If it were new we had a chance.

I went carefully to the rim and peered over the edge. I could see nothing unusual at first, only the cracked face of the cliff, a rough sandstone wall dropping almost vertically to jumbled debris far below. I was looking for a hole carved into the rock. When a queen formed a colony she first dug a burrow into the side of a sheer rock face, the entrance only accessible by air. The initial tunnel would branch inside the mountain to form a labyrinth of interconnected passages, but for a while there would be only the one entrance.

"Do you know where the opening is?" I asked Dardanis.

"Not for certain. You're close, so close. It feels near, more to the right perhaps."

I shifted over and leaned far out to look. I saw it, the dark smoothly-round hole in the stone face. It was only twenty meters from the rim, somewhat hidden from view by being placed on one side of a large vertical flaw in the cliff, an old crack in the sheer stone face, fifty meters across and some thirty deep. If I could climb down the flaw on the other side I would be directly across from the burrow's entrance. From there I might be able to bottle up the wasps in the mountain until help could come.

I thought then the code that called to the Mindmech. Somewhere an infinitesimal portion of his circuits received the encephalowave signal and cleared for a moment to scan my thoughts. There was just a brief touch of the cold machine mind—the terribly old machine intelligence that for years beyond memory had lain buried in the darkness beneath a mountain, safe from intervention while it integrated countless bits of data that poured in from sensors all over the world and directed men's lives everywhere. I felt the nausea that the touch always brought and then just a fleeting hint of fatigue, as if the machine was finally feeling its age. Then the Mindmech was gone, extracting in an instant the precise details of the situation from my mind, and leaving me alone again, except for the whisper-bird high in the air. The warmech would be coming already, dispatched by the Mindmech to help us. Not that one man or one whisper-bird mattered to the machine. But it wanted to be sure the queen didn't escape. The machine very much wanted her dead.

I moved quickly to the opposite side of the flaw.

"How many openings?" I asked the whisper-bird.

"Only one, perhaps. I think only

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

one: that is the feeling. But it's so hard to be sure."

I slung the gun over my back, leaving both arms with a maximum freedom of movement. I checked the spare ammo clips carefully to be sure they were securely fastened to my belt. I wiped the sweat from my palms on my pants and began to climb down. The flaw was old with many cracks but the rock was rotten and loose. I had to test each foothold to be certain it would bear my weight, so my progress was painfully slow.

"How long until they begin to leave?" I kept my eyes level, not looking up at Dardanis.

"Soon. They stir already. Soon they will begin to crawl out to bask in the sunlight. There are so many. Hurry, Man."

But I couldn't hurry. I had to maintain a slow, deliberate pace. A slip would mean a fall of a thousand meters with no rope to stop me. I tried to think only of the descent, keeping my mind occupied on the immediate task of finding and testing holds for hands and feet, and keeping my eyes focused close, not looking down the long way to the bottom. I tried to forget about the wasps getting ready to leave their burrow; to forget that I was totally helpless now, clinging to the rock face with both hands and feet, the gun slung uselessly across my back. But I tried most not to think about the ones hanging within the burrow, suspended in air by strands of fine, incredibly strong silk. The ones the wasps had captured—paralyzed with venom from the dagger-like sting, but living still—and each with a leathery egg implanted in his belly, soon to hatch into a wasp larva, a larva requiring living flesh for nourishment. Doomed men waiting in the darkness, their minds alive in almost dead bodies. I would soon join them if I failed.

I felt a rock ledge with my foot and gingerly stepped on it, testing its firmness. The ledge held my weight. I rotated carefully, turning around to sit on the shelf. I could wedge my back tightly against the side of the cliff by applying pressure with my legs pushing against the shelf. I sat slightly above the dark opening of the wasps' burrow and almost directly across the flaw. The entrance hole was still quiet with no movement inside.

I unclipped one swivel of the sling and fastened it to my belt, so I would have a chance of recovering the gun if it should drop. Cradling it across my knees, I loosened the flaps of the spare clips, and then held the gun in my hands, waiting for the wasps.

The morning sunlight began to move down the face, creeping toward the dark hole in the rock, a sharp line of light slowly moving downward.

"Are they ready to move yet?"

"Soon. Very soon. They wait for the sun now."

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

I would have one advantage, anyway. The wasps would be coming out of the dark in the burrow into the brightness of direct sunlight. Maybe they would be blinded by the sun for a moment, and I would be in shadow on the opposite side of the fault. Their movements would also be sluggish at first, before they warmed in the sunlight. Two advantages, then.

I watched the mouth of the tunnel carefully as the line of light moved slowly. In a little while it would reach the opening and a shaft of sunlight would stream into the burrow, telling the assembled wasps it was time to move, that it was finally time to begin their terrible hunt. I had to keep them from leaving, trapped inside the burrow until the warmech arrived.

If there was but one entrance. Then when the warmech came the queen would be trapped with thousands of unlaid eggs still within her swollen abdomen. The other wasps didn't matter, not really. The queen was the wasp to be worried about; if she escaped it would have been for nothing. She would start another colony and the long search would have to begin once more. Even if we killed all the other wasps it wouldn't matter if the queen escaped.

The sunlight now lighted the burrow's mouth. I got ready, bracing myself firmly and bringing the gun to my shoulder.

Suddenly a wasp was out of the tunnel, almost surprising me. It dropped quickly. I immediately swung along the same path as the leaving wasp and fired as it became centered in the sight. Without waiting to see the wasp hit the rocks below in a ball of flame, I quickly pointed the gun back to the entrance and fired twice more, pinning two wasps within the burrow. Smoke and fire billowed out of the tunnel.

Another wasp had managed to get free and flew about in an erratic circle, confused for a moment. Before I could shoot I knew the whisper-bird was plummeting from the sky, wings folded loosely to her sides, used only to guide the swift fall. The great clawed toes were extended wide. She hit the wasp in the center of its thorax and in one sudden movement the sharp beak thrust down to sever the wasp's head from its body. The long wings unfolded and she dropped the body, allowing it to follow the head in the long fall to earth.

"Oh, Man," her thoughts sang in my mind, "the joy of the kill. The thrill runs in my blood now. Let a few out, let me have just a few more. Let my tongue taste the blood once more." She swooped in front of the burrow and then veered away, climbing high again. "They are confused now, and later will come the fear. They will at last know fear when I find the mother."

I fired twice more into the smoke that poured out of the tunnel. The

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

wasps were trapped for a while now. They were probably still somewhat confused, but before long the queen would realize what had happened and she would know what to do. She would begin to dig out, probably as far away from the original entrance as possible. There was nothing I could do except wait and hope the warmech arrived in time.

The whisper-bird slowly circled overhead.

"Can you remember before the wasps came, before the change?" I spoke to her in my mind, never looking away from the burrow, not risking words that would give my position away. I shoved a fresh clip into the magazine by touch.

"Yes, Man. I have vague memories, lost recollections. But they're so unreal, as if I were seeing fragments of a dream. A beautiful dream lost forever. The bird-memories are real now. Be careful, Man. The wasps move."

The warning wasn't needed. I had been watching the mouth of the tunnel all the time. The smoke had cleared somewhat and I could see vague movement within the burrow as I tightened the poly-choke on the end of the barrel. They would be clustered within the tunnel, waiting for the fire to subside so they could make a rush to escape. I flipped the small lever on the trigger guard, switching to full-auto, and strayed a short burst into the tunnel. More black smoke billowed out.

I could hold them here indefinitely, but they would soon be digging elsewhere. If they broke through I would be lost.

"Sometimes I wish I'd known you before," I said to Dardanis high in the air now, almost motionless in the thermal updrafts rising from the sun on the cliffs. "I wish I knew what you were like before the change, what you looked like. Do you know what you looked like before?"

"Only how I looked to me. Who knows how one truly appears, to other eyes. Even an image lies to the mind."

"Were you pretty?"

"I suppose. Some thought so, anyway."

"Then you had lovers." The thought disturbed me somehow.

"Of course. Didn't everyone have lovers before?"

I remembered then the women I'd had before—their gay faces and empty laughter. And I had been the same. They stayed for an appropriate interval and then were gone, and soon another came. There seemed something missing now, I knew it would never be right again, there would be more needed. I wondered if she would have been the same, before. I hoped not. I thought I could detect something different underneath, a different woman underneath the bird. I wished I'd known her before

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

the Mindmech had given her the bird genes with the temperate phage, before she'd been changed to a whisper-bird to seek and destroy the wasps. I would have liked to have known the woman as I knew the bird-woman. But I would never be able to know her as a woman, not now. She would be a whisper-bird forever. There was no going back for her after the wasps had been finally defeated.

"What will you do when it's over?" I asked. "When the wasps are gone, where will you go?"

"Gone?" Her voice in my mind felt as if it came from very far away. "No more wasps to hunt? I don't know. I will be sad to have no more wasps to kill."

"You can stay with me. I want you to stay with me afterward."

"Maybe I would like that. Who can tell, though. We're so different. I'm so different now."

I looked up at her soaring high in the air. Yes, so different. She sat on a perch at base and tore raw, bloody meat with a razor sharp beak, and her eyes gleamed savagely, but I wondered if there was a real difference now. The machine had made some of us whisper-birds, given a few of us the old, wild genes that remembered the joy of the hunt and the kill. But the rest of us had learned from the birds, learned to kill with joy. We were stronger now. Perhaps stronger than the machines at last. I wondered if the Mindmech realized just how much stronger he had made us.

She saw them coming long before I could.

"They come from the east," she whispered.

I looked but could see nothing, even from my high position on the face of the cliff. "Are you sure?"

"Of course. Wait for a while. You will see." She climbed higher into the air and then drifted away over the far edge of the plateau, out of my sight.

I continued to look to the east, glancing back frequently at the burrow. It had been quiet for some time. The wasps had retreated into the depth of the mountain. That worried me. They had to be digging somewhere, trying to break free.

To the east was a dry basin. The plateau blocked the rain clouds from the sea so to the east a flat desert lay between the mountains, gradually turning to grassland farther east, as the rain shadow diminished. A city once stood at the edge of the desert, but lay in ruins now. I could still see one tower in the distance, where a hundred had once been before.

The madness of night came back to me briefly. Our gay faces had changed to masks of fear as the hungry wasps darted about the once pleasant parks and streets of the city. I heard the screams again and watched the others being carried away as I cowered in shadows.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

The dark shapes leaving seemed unreal in the harsh moonlight, but the terror that long night was real.

No one would ever return to that city, I thought.

Then at last I saw them, coming far away from the direction of the old city. Three shiny specks coming fast beneath the sun. The machines came to finish our work. Dardanis was still out of sight.

The ships landed on the plateau and presently I could see the smooth faces of the warmech peering over the edge, talking among themselves in machine language. Soon a rope ladder snaked over the rim to land silently beside me.

It wasn't really over until after dark. All day the warmech fought the wasps in the dark tunnels within the mountain. The machines could go where a man couldn't and their sharp machine eyes could see in the darkness. The wasps' sting was useless against their tough metal bodies. They brought the dead wasps to the mouth of the burrow and threw them off to fall in a heap among the broken rock at the bottom. But they didn't find the queen, the mother of the wasps. When all the other wasps had been killed, the queen was still missing, hidden somewhere in the dark.

Then the warmech began bringing out the bodies of the men carried away by the wasps. Their sting injected a potent neurotoxin that caused a very specific paralysis of voluntary motor nuclei, leaving autonomic innervation intact. The men looked like mummies as the warmech loaded them into the airships. They were wrapped tightly in silk except for the face. Their faces looked dead, the eyes closed and the color wrong—gray and pallid—and the features were lax and flaccid. But they were alive, at least their hearts continued to circulate blood and their lungs still moved air. The tissues remained viable; that was important to the egg within, so when the larva hatched it would have living tissue to feed upon. When the cocoons were removed by the medmech there would be a single clean incision high in the abdomen, already healed perhaps.

Later they brought out the ones past help; the real mummies, husks of skin, without faces, only a round hole where the face used to be and from which the young wasp emerged. And the lifeless, writhing bodies that still contained hatched larvae. The warmech piled them together with incendiary bombs laced in between the bodies. When the last body had been placed on the pile, the firebombs were ignited. The pile burned brightly in the darkness of twilight, a funeral pyre for men whose names were never known by the cold, practical machines. The wasp larvae died in the flames with the bodies of men already dead and forgotten.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

The whisper-bird had been gone since the warmech arrived and she was no longer needed. She called to me sometimes and I knew she hunted the dry canyons that twisted down from the plateau, hoping to find a solitary wasp—separated from the colony and safe from the warmech—but not safe from the vengeance of the whisper-bird. All day she had drifted high in the air, supported by the hot columns of air that rose from the margins of the mesa, watching the deep gullies for movement. But there were no wasps out today.

She returned as the pyre burned high, a ghost shape in the darkening sky, silently circling us.

Suddenly she called to me, her mind-voice excited. "The mother, the terrible mother escapes."

I looked to the east, to the dark horizon, and saw a dim shape gaining altitude. The queen had finally dug her way out from the hidden tunnel in the mountain. She would escape if the whisper-bird couldn't catch her.

Already Dardanis was in pursuit. There was no time for her to climb higher and drop down on the queen from above. She had to catch up with the queen and fight her in the air, at close quarters. She had to avoid the jaws and sting of the queen.

Dardanis darted in, slashing with her beak. The queen twisted in the air, swinging the tip of her abdomen with its stinger at the whisper-bird, but she had already dodged back out of range. And then the queen reversed the direction of her flight and came back toward us. Perhaps she thought she could lose the whisper-bird among the trees on top of the mesa, or maybe the queen was confused and had lost her bearings momentarily.

They both drew nearer. Dardanis finally got above the wasp and dropped quickly to sink her talons into the soft flesh on the back of the queen's abdomen. Her beak tore at the tough scutum but still the wasp flew onward, carrying Dardanis with her.

The air exploded beside me and I saw a flash of fire in the darkness. A warmech stood beside me. He had shot as the queen and the whisper-bird flew over. The wasp burst into flame and they both tumbled from the air.

"Let loose," I shouted to her as the flaming wasp fell, but still she hung on.

"I can't. Oh Man, help me."

They fell to the ground among the trees.

The flames licked high when I finally reached them. The dry underbrush had caught fire and the flame had spread to the piñon pine. The pitchy wood burned with black smoke. Dardanis was surrounded by fire, standing now beside the fallen queen, one wing broken. Her pain burned in my mind.

I ran around through the trees trying to find a way to get to her,

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

but everywhere fire raged. The heat forced me back.

"Man, please help me. It hurts so."

"I can't. There's no way to get to you. Forgive me."

The flames burned hotter as the resin-soaked bark caught fire. Her feathers began to smoulder and she collapsed to the ground.

Through the pain I suddenly saw her face and then she stood before me, as she had been. Her hair was long and dark and her eyes hidden. Her face was too long and the cheek-bones too harsh to have ever been called beautiful, but I knew when she smiled you would feel good watching her. She was lovely standing there, smooth curves with long legs and soft skin that glowed with youth. She reached for me.

The pain was gone from my mind but her image remained and then it too faded. I knew she was dead. The wood smoke blew into my face and I backed away coughing, turning to find fresh air.

I noticed the warmech again, standing in the dark at the edge of the firelight. He still carried the gun. The blued barrel glinted in the darkness.

His machine face was cold and immobile but his eyes glittered in the firelight. If only there had been joy in the machine's face—exultation for the kill. I could have understood forgetting about the whisper-bird in a frenzy of impatience to kill the wasp. She could have understood that. But machines couldn't be impatient, only logical and precise. And they never forgot.

For a long time after I would remember her face, the human face I saw only briefly in my mind, as the fire washed memory clean. But underneath that face would always be the cruel, yellow beak and the beady black eyes of the bird. And I would remember the joy in her mind as she fell from the sky to kill. The joy would always remain. ■

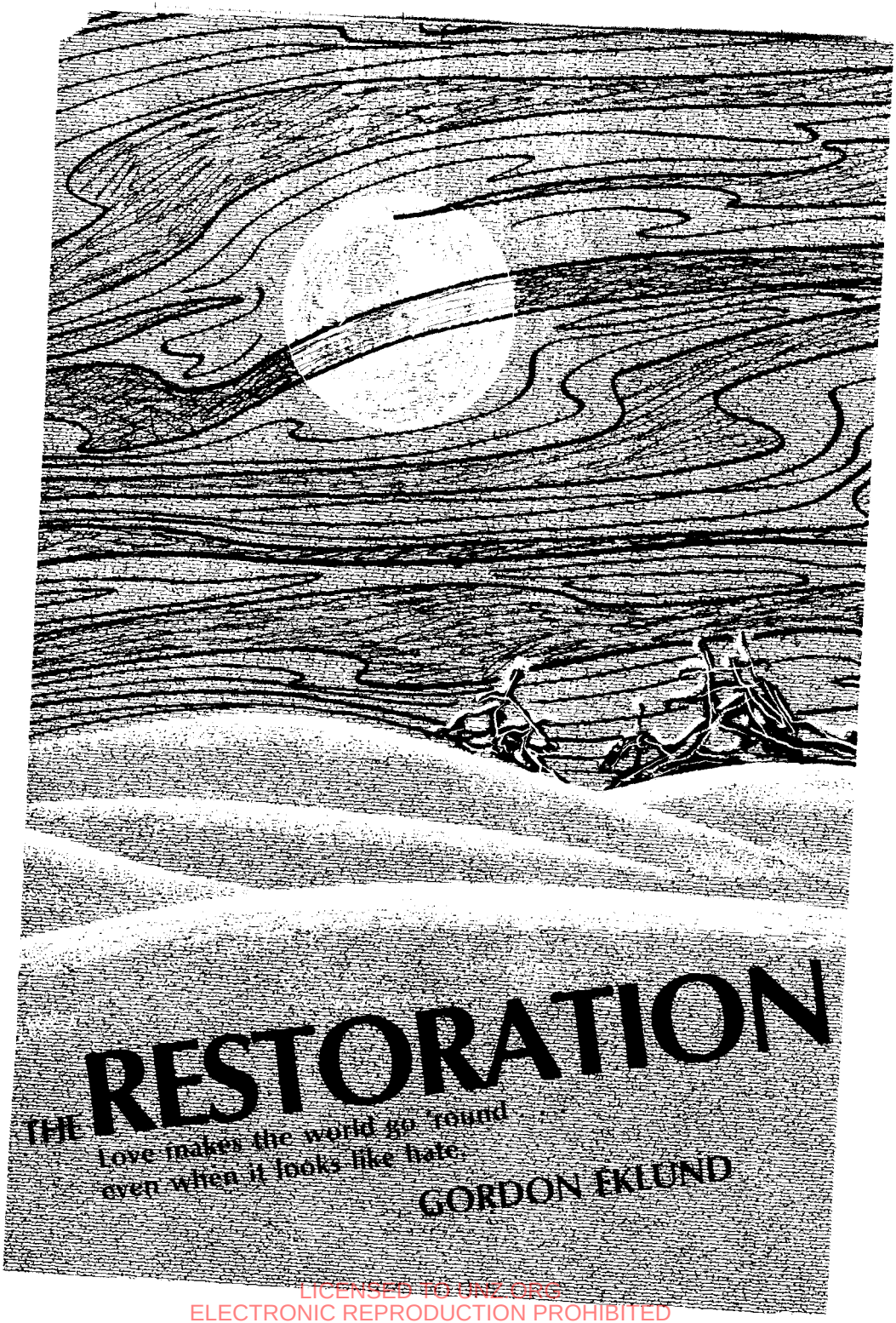
THE ANALYTICAL LABORATORY

JUNE 1975

Place	Title	Author	Points
1.	Doorways in the Sand (Pt. 1)	*Roger Zelazny*	1.696
2.	Snowball at Perihelion	*Glen M. Bever*	2.528
3.	Swiss Movement	*Eric Vinicoff and Marcia Martin*	2.800
4.	Wheel of Fire	*Barbara Bartholomew*	3.833
5.	Fault	*James Gunn*	4.011

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

LICENSED TO UIZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED



LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

I

As soon as I came awake, being nobody's particular fool, I had a pretty fair conception of exactly where I had to be. Reaching out, I grabbed hold of the ceiling (or the floor, or maybe just a wall—it was floating right beside me) and started swearing. Cursing and wailing and crying and screaming, I flayed the empty air with my free hand. I made sure all this exertion had a purpose; I directed my dirty language toward a singular target. I not only knew where I was but also had a pretty keen suspicion of how I had come to be there. "You lousy bastard!" was one of the nicer things I yelled. That damn, rotten son of a bitch, I thought. Henryk Komorowski was what I meant. He was the one to whom I was referring. For what seemed like hours, I hung in the air, calling him every name in the book and some that hadn't yet been written down.

I didn't stop until I finally went and recalled another detail. Awful as he was, Henryk Komorowski was no longer alone in the world. He had a wife—a lady—and that was Cindy, my Cindy. If I was cursing him, then I was also cursing her. And—damn it—I couldn't do that: I loved her. So, instead, like a kid, I started weeping, gushing tears like a ruptured water bag.

In the course of weeping, I happened to glance down. That was when I got the first really good look at myself. I know I must have noticed something before, but a fellow seldom pays much attention to his own physical self unless something is wrong with it. Sure enough, this time something was wrong. I didn't care to believe my eyes. I did the usual stuff in response: I blinked, started, yelped, shook my head incredulously, gave myself a good pinch.

Nothing worked. I didn't change one iota. I looked at myself again. It was real. This was me.

So, picturing Henryk Komorowski's face in front of my eyes, I took a swing at the air. That wasn't too good an idea. I immediately popped straight up (maybe down) in the air and banged my head hard against the metal ceiling (floor).

That Henryk Komorowski (even in image) packs a good punch. Holding my head, I did some more swearing.

By that way, that was how I'd known exactly where I had to be. Freefall. When you wake up and find yourself floating in the middle of nothing with no particular conception of up or down or sidewise, it's not hard to figure out. The chamber in which I was floating was a tiny place, with soft walls (excluding the place I had just happened to hit: bad luck from the beginning) and few protuberances. Down below (or maybe up above) I could see a big padded chair in which I must have been stuck at one time. The straps hung loose, so

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

I figured I'd automatically managed to free myself at some moment before my brain truly succeeded in clicking back to normal functioning. I knew I'd been doped; my head was still damned fuzzy. All the time I was cursing Henryk Komorowski (the second act), I was also prowling my new environment, bouncing hither and yon, checking things out. I discovered a large store of packaged food—looked like simulated meat—a lot of water jugs, a chemical toilet, a radio that didn't want to work, and a big round hole in one wall that looked like it might be a tunnel leading into another portion of the ship. (I had come to the conclusion it was a spaceship—I was out in the void, no doubt.) There wasn't a single window. The whole situation was a perfect set-up for throwing a claustrophobic fit, but fortunately, Henryk Komorowski knew me too well. After a hundred and twenty-odd years underground—not to mention a brief spin through space in the time before—claustrophobia was about as likely to occur to me as a typhoon back home on the face of the Moon. Enclosed spaces scare me like nothing, but a big window, wide open to the stars, might have been another story entirely. I had to thank nasty Henryk for possessing and using a few brains.

But I was speaking of myself, not Henryk. What I had seen when I first looked down upon my own personal form—what had got me so damned mad—was a thing that might have been confused with a big monkey: a gorilla: an orangutan. The tufts of black hair sprouting all over my body would have been enough—clipped—to stuff a fat pillow chair. I had muscles bulging everyplace, a chest as wide and round as a barrel, and legs like a pair of ivory pillars. I couldn't help recalling my previous self: smooth, sleek, slender. What had Henryk Komorowski wrought? Him and his goddamned hormone gun.

Escaping my anger, I maneuvered around the wall and finally said what the hell and slipped into the round hole I mentioned. It turned out to be a tunnel, all right—maybe two yards in length. I swam cautiously through and poked my head tentatively out the other end.

I saw another compartment identical to the one I had left. In the padded chair—still strapped down—a fat gorilla similar to myself was sitting. Henryk Hormone strikes again. A transparent tube—presumably containing oxygen—ran into the thing's flat nostrils. The eyes were shut but it wasn't dead—I could see the barrel chest lifting and falling.

I didn't see much choice but to proceed. I'm a social creature and could hardly reject the hideous beast, since there wasn't any cute alternative readily available. Moving ahead, I reached the chair, gripped the padded arm, and loos-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

ened the confining straps. The thing floated up and away--the air tube snapped.

All the while, I was continuing to weep, shedding buckets of tears for my darling Cindy. It was hard forcing myself to admit that my favorite great-great-great granddaughter, along with her mad scientist of a husband, had turned me into a loathsome monster.

But weeping didn't help answer the central question of the moment: if I was who I was, then who the hell was this other guy?

I floated up to take a closer look. Surprisingly, I decided the fellow was a woman. Swimming up close, I tried slapping her face, but the beard on her cheeks was thick and bristly and slapping in a weightless environment is a pretty futile process.

Then, suddenly, dimly, a pair of tiny red eyes were staring straight at mine. I saw horror reflected there, disgust, knew it was because of me, so pointed a finger right back at her, letting her know I wasn't the only one. Then I backed off toward the tunnel, knowing how vain your average woman is and wanting to be ready for a fast getaway in case she flipped. I didn't try speaking.

The two red eyes glanced down. She saw herself. More shock--more horror. Then up--back at me.

I turned to get out of there.

Then her mouth opened. Under the beard, I could hear the big jaws creaking. "Aloysius," said a voice as loud and discordant as a cannon's belch. "Aloysius—goddamn—McMurtry."

That happened to be my name. Monster or not, the hag had recognized me. I got blazing mad and shouted back: "Sylvia--you old hag--Komorowski!"

A sudden pain ripped through my belly. I grabbed myself.

"Oh Lord!" she was exclaiming. "Oh dear God in heaven, how could You do this to me?"

I felt like asking Him the same question myself. But I couldn't get a damned word out.

I was too busy being sick.

Sylvia Komorowski!

Urp!

I turned and fled to the privacy of my own chamber.

II

Back before, laying all vestiges of vanity aside, things weren't really all that much better. Physically at least. I've got to admit anyone getting a first look at that shriveled, wrinkled prune of a face I was carrying around in those years, or those frail little legs as skinny as pipestems (legs being pretty useless appendages in an environment where a man might weigh less than thirty pounds), or those scrawny hands speckled with bulging blue veins, or that husk of a thing I had to call my body—well, a man seeing all that—which was nothing more than me, Aloysius

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

McMurtry—would be very apt to sigh and say, kind of sad, "Pops, if you wanted, you could pass for a hundred and two." Anyone saying that, however, would likely be rewarded by me with a fat kiss on his apple-pink cheek.

A hundred and two, hell. I was one hundred and fifty-nine and still (I thought) running as strong as a primed bulldozer.

Though, at the time I'm directly referring to, I have to admit I was mildly anxious concerning Buddy's possible fate. Not that I hardly knew the boy. Buddy—he was just another of several dozen great-great-great grandsons. All I could picture of him in my mind's eye was a great shock of flaming orange hair. (The same color as my own used to be before I lost it all fighting the conflagration of '51, when the whole colony threatened to burn up, leaving the lot of us stranded on the dead, pocked surface of our world till we quietly expired from lack of air and water, taking our race—the human one—down the drain with us. But that didn't happen. Working together, we beat back that fire, survived, persevered, endured, and finally, after a fashion, prevailed.)

Anyway, except for the orange McMurtry hair and a flat, pig-like snout (from being mixed with the Danilina clan), I didn't know Buddy. But I did know little Cindy. She was Buddy's cousin and my great-great-great granddaughter and as pure McMurtry blood as it was possible to create without running the risk of wrecking the species from too close interbreeding. And I also knew, if Buddy lost the feud with the designated Komorowski, then he would be dead but my Cindy would be a hell of a lot worse off than that.

She'd be a Komorowski herself. And that thought was enough to make any old man sick down deep in the pit of his gut.

They were feuding out in the corridor while I squatted in my cavern, door open, writing notes on the top sheet of a foot-high stack of parchment. It was pretend work, something to keep my anxiety from getting the best of me, yet another page in my famous (and unpublished) chronicle, *The Entire and Total History of the Remnants of the Human Race from the Time of the Final War 2019* AD *until—*

I left that last space blank on purpose, figuring somebody else could fill it in when I was gone. Publication of the book—or its circulation, actually—was being reserved for my post-expiration years. The way I figured it, a man ought to have something about his death to which he can look forward with a degree of anticipation. And that book was mine.

I cannot recollect exactly what those particular notes concerned. I was lagging maybe two years behind the current date, but I do hope it was, appropriately, some-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

thing regarding the Komorowski clan—meaning something nasty and cruel and unfavorable, because that's all I ever wrote about them. The book was full of such stuff and I remember how I always hoped, for that reason alone, that old Sylvia Komorowski might survive me so she could read what I had said about her.

As I wrote, I spied, now and then, a flash of light flickering from down the corridor. Listening closely, I could hear the whir of a stungun. Buddy and the designated Komorowski were really going at it. They had started stalking each other some six hours back. Of course, they'd have to keep going till one or the other was dead. Neither Sylvia nor I was about to compromise on this one.

A flash of light. I glanced up.

Go get him, Buddy, I thought. Looking back down, I pretended to be absorbed by my notes. *Waste the bastard.* In my own time, I had slain upwards of a dozen Komorowskis, not to mention a fair number of Lincolns, Jorgensons, Ivanovs, Bandinis, and Wongs. There were thirty-eight full-fledged clans in the colony and we McMurtrys made it a practice to have bad blood always flowing with several at any given moment. I didn't expect Buddy to be as good as me—I just wanted him to plug that one Komorowski and save my Cindy from her dreadful fate.

Then I heard a howl of pain. Something went *plop.*

Oh-oh. I knew it was over.

I laid my pen aside and prepared to wait. I was surprised to see my hand was actually trembling. I thought: *which?*

Then, an instant later, I heard the noise of boot-heels approaching from far down the corridor.

The boot-heels clicked insistently. I recognized the tone. It was my Cindy.

Shortly thereafter, a face appeared in the doorway. I laid my pen aside, looked up, smiled. I thought Cindy was a gorgeous hunk of a kid. I looked straight into her green eyes and saw the way they were sparkling like the naked sun.

I let out a loud groan.

She nodded and I knew for sure.

Poor damned Buddy—dead as a clam.

"You don't have to say a word," I said.

"I won't." She bounced into the cavern and sat down beside me. "But I'm so . . . so glad."

"I knew you would be."

"But I am—kind of—sorry for you." Her hair stretched the length of her backbone—not orange either, fiery red. "Too bad Buddy was such a lousy shot."

"A lousy shot!" I exploded, furious as a tickled bull. "Goddamn it! You told me he—"

She shrugged. "So I lied. Pops, you taught me. You said a person's

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

got to be slick. Besides, Buddy wasn't all that bad. He lasted a whole six hours. But Henryk's just in a class by himself."

"Henryk? Not Komorowski? He fought for himself?"

"Why shouldn't he? We happen to be in love."

"Don't rub it in," I said. "Being in love with a Komorowski makes you a traitor to your clan—and to me."

"But not to myself."

"You always were a selfish one."

"I learned that from you, too."

We went on like that for some time but neither of our hearts could really get into it. She finally got me to agree to attend the combined feudend and wedding feast and went back to her cavern. I stayed where I was, sulking. That day happened to be the happiest of Cindy's life; she told me so, straight out. As for me, I couldn't even claim it as my saddest.

I've got an ego but it's not quite that huge.

It was my second saddest day.

III

The first saddest day came, of course, exactly thirteen days after I'd first set foot on the Moon. I was what was called, in those ancient times, a working journalist—the year being 2019—and what I did was interviews on television with various notable celebrities—presidents, singers, sheiks, sirens, footballers, ventriloquists, generals and admirals. I had been born in a place called the United States of America but had chosen upon reaching my majority to return to the home of my ancestors. I then occupied a small private flat in the city of Belfast, the nation of Eire, the continent of Europe, the planet of Earth. These are facts no man is apt to forget no matter how great the interim—in my case, one hundred and thirty years—that might pass.

I remember as clearly as the day before yesterday when my producer—an ugly old salt—popped his head into my office and said, "McMurtry, you're going to the Moon."

My reply—if I recall it exactly—was: "The hell I am."

"Tomorrow afternoon from Florida."

"No, sir."

"You afraid of space?"

"I'm afraid of nothing. It's the underground part I don't like." Everyone knew the colony on the Moon was located beneath the surface of that world. A half-dozen levels—fresh air constantly pumped—hydroponic gardens—meat-processing works. But I didn't happen to like descending even a dozen steps underground in order to catch a subway car.

"I thought you liked this job, McMurtry."

I told him I considered it a good job, well-paid.

"Be a damn shame to lose it," he

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

said. "I recommend you sneak a jug in your pocket—I assume that's what's really worrying you—and be happy."

"Smuggle booze onto the Moon." I snorted. "They'd have my hide."

"You don't and I will have it first."

So I went, preserving my hide. A young cameraman—Rob O'Hara—tagged in my wake. The pair of us were ferried to the Orbos IX station—the liftoff from Earth easily providing the worst moments of the voyage—and from there rode a shuttle directly on to the Moon. While there, I conducted the usual batch of interviews. O'Hara burned several reels of film-tape. Mostly, we were bored. I didn't like the Moon or its denizens. Frankly, the colonists gave me the creeps. They reminded me of nothing so much as a batch of fleeting, flickering ghosts. They were so pale, and almost all of them skinny, and the way they floated down the long underground corridors with such practiced ease made shivers dance up and down my spine.

And I loathed the damn commander. A pompous ass. Him, I was expected to interview at least once a day. The worst parts of the whole assignment. I fell asleep once, O'Hara twice.

But finally—after thirteen days—it was time to say bye-bye. Our ship was due from Orbos IX, so I went down to pay my last respects to the commander.

Did I mention his name? It was Komorowski. This time his daughter was in the office with him. Little Sylvia. No more than six. Already ugly as any old hag. I hated all kids—especially little girls.

Sitting across from Commander Komorowski, the kid darting around my legs, I tried to talk fast and get it over.

Komorowski thought he had to make a speech. He was tense—irritable—and wouldn't let me interrupt. The importance of good public relations. His belief in a free world press. Duties. Responsibilities. Capabilities. I yawned.

When the kid interrupted, he shut up. She was standing between my legs, her finger in my face: "Daddy, why does this man have a red face? Is he an Indian?"

"Indians don't have red skin," Komorowski said. "More often, they are brown or—"

"But his face." Her nasty little finger hadn't budged. "It's all red and icky."

Komorowski started to explain that, on Earth, where men lived directly on the surface, the sun would—

The brat was sharper than that. "And his breath. It stinks awfully. It smells like oil."

This time Komorowski glared right at me. He sniffed.

I leaned way back in my chair. The room wasn't big enough.

"That," Komorowski said, "is liquor I smell."

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

"Oh? You think so? But that can't—"

"I know it is," he said. "And since I also know that not a drop of liquor exists in this colony, it means you brought a quantity from Earth with you." As he spoke, he grew increasingly angrier till he was actually sputtering. I received the distinct impression something bigger than me and my booze was bothering him, but such knowledge did not ease my discomfort. I was well aware—the fact had been specifically mentioned during the initial briefings—that the Moon commander had powers similar to those once granted, on Earth, to sea captains. In other words, if he got the urge, Komorowski could have me hanged.

The little girl—apparently a lot more sensitive than she looked—darted into a corner and hid her ears.

When Komorowski finally stopped sputtering, it was my turn to speak. With a sigh, I tried the truth: "OK, I brought a bottle. You know why? Because I was afraid—scared I might get afraid." I pointed to the roof. "I suffer from claustrophobia. On Earth, I'm afraid even to—"

He exploded then. Damn near literally. I learned a lesson: screw the truth. He afforded me all the facts at his disposal concerning the absolute importance of every ounce of weight aboard a spacecraft. He told me of the dangers of alcohol in a high oxygen environment. He sputtered about the precarious nature of life on the Moon, how even the slightest dulling of the senses could lead to ultimate disaster. He ended with an ugly smile:

"The accepted punishment, in this colony, for any form of intoxication is death."

I said, "Oh." Very, very softly.

Well, I didn't get hanged. It was close but I escaped the noose. Komorowski tossed me cleanly out of his office and promised to inform the authorities on Earth, who would no doubt arrange an appropriate punishment. I saw my press credentials going up in flames. I reached the door before Komorowski called me back and added:

"I almost forgot. The ship that was supposed to carry you back to Earth. It's been delayed—turned around. I'm afraid you'll have to wait."

"Well, isn't that just—?"

His glare silenced me. Little Sylvia giggled like a witch.

I turned and slinked out the door.

In the corridor, I paused briefly and slammed my fist against the wall. I felt instantly better and started to move away.

Just then, a young, pale, very nubile woman sped past, sobbing her blue eyes out and wailing like a banshee.

Curious in spite of everything, I chased after and grabbed her.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

"Is something wrong?"

She fell against my chest and went right on weeping.

There was nothing else: I hugged her and whispered sweet nothings.

Finally, she drew away. She cried out: "Does he know? Did you tell him?" She waved frantically at the door to Komorowski's office.

"Not me," I said.

"But does he know?"

I couldn't resist: "Know what?"

She screamed as if I had pinched her. I started looking for a way to run. She said, "About—about Earth."

"What about Earth?" I asked. Vaguely, I saw the door to Komorowski's office pop open. His long, drawn, pale face stood in the opening.

"That it"—this was the girl—"that the Earth—the whole planet—everything—everybody—there's no one alive there any more. They're all—all dead."

IV

As soon as I was sure I could talk and make myself understood, I poked my head back into Sylvia's compartment and told her I didn't intend talking to her. I pointed out—clearly, rationally—that since the ship was neatly divided into separate and equal chambers, if she stayed in hers and I stayed in mine, we could then split up after reaching our destination and thus avoid any undue personal contact. I added that I hoped—ten minutes after we went our separate ways—that she'd drop dead.

I couldn't tell how much of this got through. The old hag was raving in her inimitable way. Mostly, she busied herself calling my Cindy foul names more appropriate to herself. "And that Cindy—she took my poor Henryk and manipulated him into doing something I know he would never have done on his own. That witch—everything she touches—even poor Henryk—it goes sour."

I had been floating near the tunnel mouth but there's only so much a man can take. That last remark had exceeded those boundaries. After all, Cindy had been known to touch me.

I gauged my trajectory, then launched myself straight for Sylvia's throat. I opened my mouth, prepared to tear her apart. With luck, I struck straight home. I bit down. Sylvia slipped loose. Clang! My teeth snapped together. Ouch! I yelped. Sylvia, laughing, clubbed me viciously over the head. I groaned, rolled away, kicked the air, flew back, hit the wall, bounced off, and came at her again. This time, I extended my feet for a double-clutch-kick, but she squirmed aside in the nick of time. Missing, I zoomed straight to the wall, careened off, and managed to stop myself in mid-air.

She was coming at me again. Sticking my head out, I met the crown of her skull with my own.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

We struck like a pair of butting billy goats. Both of us bounced. I didn't get hurt at all this time but neither did she.

So we went at each other again.

After several further clashes, it became apparent that nobody was going to hurt the other. I ducked away toward my tunnel. Past a shoulder, I explained what would occur if she should try to follow. She warned me on trying to return.

For once, we paid attention to the other.

Back home, I found—to my surprise—that I was damn hungry. I went and inspected the stores, then ripped open a couple packages. Meat—simulated meat—raw. Nothing else. I glanced around the chamber but saw nothing that might serve as a stove. Strangely, the meat looked good. I decided to give it a try. I took a bite, went *umm*. Raw or not, I liked it. Another bite. Another *umm*. Then the whole chunk.

I swallowed five pounds of raw, bloody meat, then made myself quit. It must have been those hormones.

I roamed the chamber for a while. I found a valve which, when depressed, cleared the air. Through the tunnel, I could hear Sylvia muttering and cursing. I thought I heard Cindy's name. I shouted over to Sylvia that she was an ugly, shriveled, stinky, unpleasant old hag.

She replied that I was pretty much another of the same.

I was getting tired of floating. The meat, down in my belly, seemed to be getting larger in mass. Dropping into the padded chair, I strapped myself down. A few moments later, I dozed off.

When I awoke, I was smashed against the back of my chair as flat as a flapjack. It was as hot in the compartment as the pit of Hades and the walls seemed to be glowing red. I tried to scream but my tongue was glued way to the back of my throat. Directly in front of my eyes, on the wall, a huge red sign was flashing: FASTEN ALL RESTRAINING BELTS!

I thought about Sylvia next door and wondered if she'd seen the sign in time. The force pressing against me got stronger and stronger. I couldn't think. I felt like ten thousand pounds of squashed blubber. My eyes jammed shut. It was hard breathing or swallowing. I knew I was dying. Never in my life had I felt anything like this.

Then I realized that was a lie: I had felt it before. But only once. One hundred and thirty years past. In Florida. The time I had last left the green-and-gold surface of my world.

And now—at long last—I was coming back home.

I felt a jerk. The pressure lessened. My stomach fell out of my mouth and did a couple graceful flipflops in the air but then everything was better. I knew we were

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

going to make it. Sylvia too. I could hear her now. Sounded like she was puking.

But she could've been worse off. Both of us. We were damned lucky. Up was up now, and down was down.

And we were heading down.

V

To indicate what a vulgar bunch the Komorowski clan was, by the time Cindy and I—hefting Buddy's stiffening carcass between us—arrived in the central cavern of their habitat, they had already set up the banquet tables and started the oven heating. I just stood there glowering, but Cindy—with a golden heart—pretended not to notice the breach in etiquette. Dropping Buddy's head, she sprinted up to the head table, grabbed Henryk, and let him hug her. I looked away, preferring not to gag so close to dinnertime, but my gaze lit on old Sylvia Komorowski instead. Ugh. What a place for a man with a sensitive eye.

This was going to be a double-banquet, a pretty rare event, but the marriage took precedence over the feudend, which was why the tables were not separate. It also meant I had to sit right up next to Sylvia. I dropped into the chair and turned my head instantly away but there was Henryk on the other side and that was hardly much of an improvement. I ended up staring at my empty plate, hoping Buddy would turn out to be a fast cooker.

Sylvia first. Unlike me, and despite being thirty years younger, Sylvia showed her age. She was also damn ugly, with a chin like the head of a needle, a nose like a squashed slug, and skin as dull and wrinkled as that found in a slum bathroom. What lay underneath wasn't much prettier: her brain had more holes than a badminton racket and her heart had the shape and texture of a petrified toad turd. Like me, and unbeknownst to us both, she would shortly be gaining a whole new appearance—on the outside, at least—so I won't go on to describe any more of the dreadful details.

Henryk, I guess, was Cindy's age—maybe a decade or two older, barely a speck in time. He was big, dark, good-looking (I'm trying to be fair about this) and about as warm and cuddly as a dimestore toy robot. I hated his rotten soul even before he played his trick and made me into a monster.

So, what all this meant was that during the ensuing meal, I did damn little chatting.

Neither did anybody else. Except Cindy. But she was always like that—a princess of politeness.

The whisky was damn fine and I kept pouring cannonshots. At one point, Sylvia whispered: "Better watch the sauce, Pops. My dad's ghost might be watching."

I spat a mouthful in her face. All

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

she did was lick it up, smack her lips, and grin toothlessly.

I poured me another.

Buddy did cook up quickly and I was damn glad for that. I'm afraid I gorged myself a bit. As a clan elder, I got my choice of cuts. Buddy was young, soft, and tender (though a lousy shot), and his fingers in particular were damn good; you could suck the meat right off the bone.

As soon as I was full, I stood up and said: "OK—where's the little sneak?"

I meant their priest. Somebody ran off and dragged him up. He was a slimy fellow with a dirty black book. Henryk and Cindy started hugging and fondling. The priest read vapidly. I yawned. Sylvia wept. Somebody said they were married.

I turned, ready to make a break.

"Sit down, you idiot," Sylvia growled at me. "It's not over."

Henryk raised a hand in my direction: "There's something I wish to announce, Mr. McMurtry."

"What?" I shrugged and sat. "You're pregnant?"

"No, sir, but what I have to say is almost as incredible."

"Sylvia's pregnant?"

"Shut up, McMurtry," said the subject of my conjecture.

Since it's lousy decorum to fight during a feast, I did as requested.

Henryk started right up: "I want to say that today has been the most satisfying day of my life in two respects. I have won two great victories today—one personal and the other public. In the one case, I have been allowed to marry the only woman I have ever wanted. In the other—and this is what I wish to announce—we are all equally fortunate. A general announcement will shortly be made throughout the colony, but I wished to be able to tell you—my fellow clansmen, Mr. McMurtry, Cindy—before everyone else."

I repressed a snore. Maybe he planned on having triplets.

"Quite simply"—he made a dramatic pause, into the middle of which I let loose a tired wheeze—"the Restoration Project is now complete. I have succeeded, in spite of the general cynicism of this colony. Within a few months—perhaps weeks—the first of us will be able to return to the Earth."

Throughout the cavern—from the tiniest infant up to old Sylvia herself—everyone gasped.

Not me. I said, "Bullcrap."

"No, sir," Henryk said, fixing his gaze on me. "In fact, you of all people should have known. The project was a long ways from being impossible. We have a half-dozen ships at our disposal. The launching equipment is there. The Earth is a big target, hard to miss. Certain adjustments—to allow the craft to descend into the Earth atmosphere without burning up—were necessary. I made them. Other than that—"

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

"And how are you going to bring them back?" I said, as bluntly as I knew how.

"We don't," he said, continuing to meet me eye-to-eye.

I gave him a horselaugh. "Then who are you going to get to go?"

"The spirit of adventure," he said, "is not dead. Even in this colony."

"The spirit of adventure is going to be squashed flat when it tries to walk in Earth's gravity."

"That can be overcome. A supply of certain hormones capable of—"

"Not that poison," I said. "You'll turn everybody into monkeys." The hormones had been very popular on Earth in the years before the Final War: athletes.

"But we don't intend to rely entirely on drugs. The human frame evolved upon the Earth. Man is an immensely adaptable creature. It is only logical to assume—I would bet my life—that he can survive on his own world."

"You'd bet what?" I asked.

"My life," he said.

"In that case, you're on. And don't think"—I waved a threatening finger at him—"I don't intend to collect. In full."

But—the sly bastard—he made damn sure that would never occur. In order to win the bet, I'd have to be squashed myself.

VI

It certainly wasn't anything like the way I remembered it. The Earth? That was damned hard to believe. At first glance, it looked more like hell to me.

As soon as the spacecraft set down—with a savage bump that nearly tore me out of my seat—a door in one wall automatically began to unscrew. I unstrapped myself and staggered over to watch. The increased gravity hit me immediately and I swayed worse than a drunk on Saturday night. But I didn't fall—I wasn't squashed—Henryk was correct on that account.

On my way over, the door fell out. I heard a distant thud and saw a circle of vague, grayish light.

That was enough. In spite of the gravity, driven by a sudden urge to see the old world at any cost, I rushed on ahead, ducked into the hole, and slithered down a six-foot tunnel. At the end I found myself hanging about ten feet above the ground. Still driven, I didn't pause a second. Like a fool, I jumped. Hitting the ground, I sank knee-deep in what I thought was soft sand. Lucky it was there: otherwise, I would have broken both legs.

I wasn't concerned with that at the moment. Turning my head, I looked straight up into the sky, hoping to see I don't know what: anything, I guess. But I saw nothing. The sky was gray, the air was thick and dankish, and there was barely a hint—a bright round spot in the gray sky—of the sun lying beyond.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Unimpressed. I looked down. The stuff at my feet, I soon discovered, was more like ash than sand. The particles were light, delicate. Move a foot and the stuff flew up, drifting gently through the air. And that was all. Way in the distance I thought I made out the summits of a pair of hills. But there were no flowers, trees, foliage. There was the ash and nothing more.

This was home?

Then, abruptly, from behind, a harsh, ugly voice interrupted my reverie: "You stupid fool. At least I had brains enough to bring these."

I turned slowly, not needing many brains to guess the source of that voice. I looked at her hands. She held them up so that I could see. She was holding the radio in one hand and a long hunting knife in the other.

In a flash, I knew she was right: I was indeed a fool.

"But I didn't mean—" I pointed desperately back at the ship, at the open door hopelessly high above.

"I assume," she said, "that means you did forget. The radio, the food, the water, weapons. You left everything behind?"

"We could build a ladder—"

"With what?" She waved a hand at the desolation around us. "Do you see any wood out there? A hammer? Nails?" She was really roaring now and all I could do was stand there and take it. "I expected more of you, McMurtry. Can't you get it through your thick skull that this is an alien world? It's not the Earth any more. That place is dead. This food—the little bit I saved—it won't last more than a few weeks. We don't have time to—"

"Hey look," I said, indicating the radio. It was going *bleep-bleep* in her hands.

"I thought so," she said, laying down the radio, then crouching and twiddling the dials. "Now we get to hear from them."

I came over to watch. Clouds of ash floated around me. "I couldn't raise them on the ship."

"They didn't want to be raised."

"But now they want to know if we're alive."

"Or dead," she said.

We both fell silent. Sylvia continued to twist the various dials. Then, all at once, a voice popped through the haze. It was Henryk Komorowski:

"Sylvia? McMurtry? Are you there? This is the Moon Colony. Sylvia? McMurtry? Are you—?"

Sylvia slapped a button, then bellowed at the set: "Right here!"

"Thank God!" Henryk said. In the background, I could hear other voices raised in pleasure. "We thought you might have been lost."

"Oh, we know where we are," Sylvia said.

Henryk tried to laugh but it sounded guilty to me. I reached out quickly, intending to grab the radio, but Sylvia popped me on the nose without needing to look. I received a practical lesson in relative

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

gravity. I felt like I'd been clubbed with a boulder as big around as the Moon. I flopped straight on my tail and sat there dazed and swaying.

Henryk was saying: ". . . felt we couldn't tell you. There's no point in covering this ground another time, Sylvia. You must know why you were chosen for the first trip. That little shuttle could only carry two passengers. You were expendable. The next time—if you survive—we will send more."

"And ask them first?"

"I can't tell you that," he said.

She snorted. "Well, I don't give a damn. After a hundred years on the Moon—and more—I guess I deserve a change. But tell me this, why the hell did you have to send this oaf along with me? Didn't you know he'd—"

"Why, you old hag." That was me. I had regained my feet and made a doubled-up fist.

"Not now, oaf," she told me.

"Because McMurtry was even more expendable than you. And because he had been there before."

I dropped my hand, cursing softly.

She then went on to tell Henryk about my stupidity and the resultant food crisis. He was not impressed. "The supplies were intended to last only a short time."

"And if we find nothing to eat?"

She described our present environment.

"Then, I'm afraid, you'll have to starve. And, of course, we may decide to cancel the project."

"Then it's strictly a matter of survival," she said.

"If you survive, then we send more. That's the way—"

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

While they were talking, I was creeping. By this time, I had made it close enough to risk shouting. So I did:

"I want Cindy!"

Sylvia threw a fist at me but I ducked.

"Right here, Pops."

"Cindy!" I cried. "Cindy, how could you do it? Don't you realize I'm all you have?"

Clearly embarrassed by my outburst, Sylvia moved away.

"I did what had to be done," the radio said, "for the reasons Henryk gave. You're old, Pops, and the colony can spare you. Having survived here so long, we thought you ought to be able to survive there, too. At least, we hoped so."

"But I'm ugly, Cindy. You shouldn't have let him use those hormones on me. He turned me into something, if I saw it in a nightmare, it would keep me awake for a week."

"Ugliness is relative, Pops. Give yourself time to get used to yourself."

"But, Cindy, can't you understand how I've got to feel when—" The radio abruptly disgorged a burst of static. I shut up, waiting for it to go away. Sylvia made no effort to regain her place. When Cindy was able to speak again, I asked: "Where? That's the only thing I want to know now. Where are we now?"

"On Earth," she said. "Where else?"

"No, no, I mean what place? You know the old maps. Ireland, Russia, Australia. Where did you send us?"

"Noplace," she said. "We didn't know where you were going to land—we still don't. You could be anywhere. On Earth in the old days they had computers and everything else to—"

"Noplace!" It took me a moment to realize I was screaming. "Do you realize the Earth is seventy percent water? Why, we could have been killed. The odds were against us. Why, you little no good—"

Fortunately for Cindy, the static came rustling back and this time it didn't go away. I finally had to give it up.

Sylvia reached past me and clicked a dial. "OK, Pops," she said. "Enough is enough. Up and at them. This world—it's all ours now."

In spite of myself, I took a look around. She was right. It was ours—all of it.

VII

Karlton Z. Komorowski, Commander of the Moon Colony, Major General in the Polish National

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Air Force, knew. All the time he had been so busily chewing my tail over a few errant drops of whisky, he had been simultaneously in possession of a set of facts so monstrous as to dwarf my transgression and make it seem no larger in comparison than an infant termite.

I was still holding the weeping girl, trying to make her explain her outburst, when Komorowski sprinted away from his office door, swept the girl neatly from my arms, backtracked, ducked inside, and sealed the door. Recovering, I went over and knocked.

"Hey, Komorowski—what gives?"

No answer.

So I knocked again. Then I talked. I kicked, pounded, shouted, screamed, swore, but nobody answered.

I knew the girl. I remembered she worked in the observatory. If Komorowski wouldn't tell me what gave, maybe somebody else would. I went away toward the observatory. I didn't get far. I took the elevator to the top level and found it was sealed off. A heavy lead door blocked my way. Nobody could get in or out.

There didn't seem to be much else to do. The corridors were strangely empty and the people I saw I didn't know and, if I had known them, I wasn't sure I wanted to talk to them. I went home to the cavern I had been assigned and found Rob O'Hara waiting for me there. His bag was packed. Without any hesitation or delay, I told him exactly what had happened.

In reply, he gave me a fine example of his famous horselaugh. "Good Lord, Allie, old pal. Are you a gullible sot or are not you? Whole planets simply do not extinguish themselves of life—at least ours—sweet Earth—does not."

Since it was my turn again, I taught him a lesson by informing him our ship wouldn't be coming.

That got him mad. He demanded a drink. I told him—truthfully—that the jug was empty. That got him even madder.

Well, to take the full story and condense it down to a few essential phrases, what happened was that Commander Komorowski sat upon his nasty secret for six full hours. When he finally emerged upon the colonial public address system, Rob and I were still cooped up in our tiny closet of a cavern, trading newly invented insults with each other.

But as soon as we heard Komorowski's voice—he coughed—we shut up in an instant.

Rob winked at me, indicating I was about to be made a horse's ass. I winked too, hoping he was right.

Komorowski began: "Ladies and gentlemen of the colony, I have a brief announcement to make of such extreme significance that I feel I must deliver it without any attempt at prelude. I am afraid there is no conceivable way I might warn

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

you in advance of what I must say except by simply stating the bare facts as I know them. We are all professional people—most of us are scientists and engineers. We are rational men and women, unafraid in the face of an awful truth." His voice sounded flat; it was quite devoid of base emotion. "Therefore, I must inform you that, at 0900 GMT, July 21, 2019, open hostilities commenced between various nations of the European, American, and Asian spheres." July 21: more than a week ago. "At the time, reports reaching me, the majority of which were kindly forwarded by the personnel of the Orbos system, indicated the possibility of a wider conflict. In the days immediately following, additional nations were indeed drawn into the hostilities. Soon, the spectre of genuine world war hung over the Earth for the first time in many decades. In order to avoid unnecessary anxiety or concern, I elected, through my discretionary powers as commander, to withhold knowledge of these troubled events from the personnel of this colony. My first duty—then as now and always—was to protect the general colonial welfare. In any event, three days ago the conflict greatly worsened, when one of the combatant nations chose to launch a particularly deadly retaliatory attack upon one of its many enemies. The weapon utilized for this attack was apparently a chemical device of recent and confidential origin. It proved quite successful in practice; heavy losses were inflicted upon the aggressor enemy. Shortly thereafter, however, puzzling reports began to emanate from the areas of attack. In piecing these reports together the general conclusion reached has been that the apparently chemical device also contained bacteriological matter. Put bluntly, the enemy's drinking water was poisoned. An epidemic of unprecedented severity struck the enemy. Unfortunately, other nations refused to still their weapons. Additional chemical and bacteriological attacks followed. By 0856 GMT, July 28, 2019, atomic attacks had commenced. Three hours later, radio contact between Earth and the Orbos system ceased. Their telescopes, and ours, tended to indicate continued hostilities—perhaps programmed maneuvers—for some twelve additional hours. Since then, however, there has been no contact of any kind with the Earth. The most likely conclusion, therefore, is that civilization as we know it—if not life itself—has been destroyed. If this theory is subsequently shown to be in error—or if any other pertinent information comes into my possession—I promise that you shall be informed of its substance at once. Otherwise—despite our great sorrow—we must carry on. I thank you for your kind attention and that is all for now."

As far as I could tell, it was quite damn well enough. I looked

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

at O'Hara and he looked at me. Together—working like a team, passing the ball—we cursed Commander Komorowski up one side of our cavern and down the other. It didn't do a damn bit of good. The world was still ended.

A couple days later—Komorowski remained barricaded in his office, making only occasional public announcements—we learned that a ship had been fired by the Orbos IX and sent down to Earth. The crew had landed safely in Florida. Within six hours—after reporting general destruction—radio contact had ceased. The men were necessarily presumed dead and a decision was reached not to attempt further direct missions to the Earth. Instead, the Orbos personnel continued to search for life with their radios and telescopes. They found nothing.

I suppose it took most of us at least a full year before we could admit the truth to ourselves, that life on Earth—at least life as we had known it—was ended. We were stuck forever where and as we were—alone on the cold Moon—the final, overlooked remnants of what might otherwise be an extinct race.

Eventually, Komorowski opened his office doors. A short time later, it was announced that some of the Orbos people, running dangerously short of supplies, would be coming to join us. Since the shuttle craft available to them could carry only a quarter of their total number, lots were drawn. Those who failed to win died within a few months. When they were all gone, the known population of the human race was reduced damn near in half. We kept our telescopes focused on the Earth. Except for a few charred places—and the total absence of lights at night—it looked like the same old place. We cornered Komorowski (once that was possible) and battered him with pertinent and impertinent questions. We got what he asserted was the whole story: atomic and laser weapons, all sorts of chemical and bacteriological devices—the entire arsenal of modern warring man had seen desperate use during the brief activities of what we now called the Final War. In other words, all hell had broken loose. It was a sad way to end it all. I think most of us—excepting maybe Komorowski of the cold, hard heart—shed at least a few genuine tears for the universal stupidity of our departed and beloved brethren.

A few wits—and, yes, I guess I was one—made ready quips about the ingenuity of the human race in solving its overpopulation problem. But that joke seemed less funny when our supply of birth control pills diminished and we were faced with a birthrate problem of our own. We still had plenty of room for everybody—the colony, fortunately, had been built with an eye toward the future—but the way we were breeding it wasn't going to be

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

long. Komorowski, as commander, then issued his "Edict on the Rate of Acceptable Population Growth Among Citizens of the Lunar Colony." We all got several horselaughs out of that one, especially when he moved into the rich area of methods and devices, none of which were exactly new and all of which were about as feasible as trying to push a millionaire into heaven through the eye of a dung beetle.

But it turned out he was serious. In fact, once a couple strategic backs were turned, Commander Komorowski ordered martial law and set himself up as our chief and only boss. He started ruling with one of those iron hands you're always coming across in the history books. Personally, the situation struck me as a pain in the ass. I was about the only nonspecialized person in the colony. Even Rob O'Hara knew how to take photographs, but that talent was made irrelevant when Rob went and impregnated a certain lady engineer. Komorowski had him hanged. Me, I kept my pants buttoned and instead drew every rotten, menial job the colony had available. I washed toilets and polished silverware and swept corridors and tended gardens. But tedious work has a way of making the brain work overtime to fill in the dull gaps. Soon, I was doing more good thinking than at any time since school. I was remembering a few things about Komorowski's original announcement. In particular, something struck me as weird about the way he had described the initial chemical attack that had led to the end of the Final War, something almost apologetic in his tone. And what about that other thing? What had he been trying to prove locking himself in his office for so long? I knew damn well he wasn't shy. No, sir—but he was sly. So I kept thinking, seeking to try a bit of slyness myself, pushing that endless broom.

VIII

During the days we walked. At night we slept. At least that's the way we thought it was. With a constant dark mist swirling around us—in spite of occasional fleeting glimpses of something that might've been the sun—it just wasn't that easy to tell. Sylvia had a watch and she claimed it was accurate, but I just didn't know. A liar in one thing might always be a liar in another and one thing for sure was that Sylvia was a liar.

So where did we go? What did we see and do? Frankly, damn little of anything. I guess we went almost everywhere, but since the landscape barely changed, that wasn't too significant. Oh, sometimes there were hills and valleys. So we went up and then down. The ground alternated between stretches of hard rock and places where the soft ash covered everything. Once we passed a big blue

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

lake surrounded by bare trees. I made Sylvia pause while I broke off a branch, stripped it naked, and stuck one end in the water. Naturally, it didn't work. Sylvia laughed like the devil. I got mad and peered down into the water but if there were any fish in there they thought I was ugly and kept a safe distance.

By that time—to explain the stuff with the stick—we were in a heap of trouble. You guessed it? Right. We were damn near out of food.

Sweet Sylvia, the hag, said it was all my fault. I was, according to her, gorging myself on the stores. I said, no, sir. It was her fault. She had been elected (by me) to haul the heavy crates behind her—a harness strap had wisely been provided for the purpose—and the way I saw it the more she ate the less she had to pull.

She called me a liar for saying that. I pointed out that she was one too, only bigger.

She said, "McMurtry, damn it. You know you've eaten three pounds to every one I've touched. If you want me to institute rationing, I can—"

"What? You?" A big horselaugh. "What right do you have to- ?"

"If I don't—if someone doesn't—we're both going to starve. What do you plan on eating when the stores are gone? Bugs? Twigs? Leaves? Dirt? That's all we've found and not enough of anything to fill even half of one of these bellies. If there wasn't already such a word as selfish, they'd have to invent it to describe the likes of you. If there wasn't—"

"You old hag," I said, and slapped her.

"You fat oaf," she replied, and punched me.

By that time we had both learned to aim our blows so that nobody got hurt. The sad, rotten truth was that neither one of us was overeating. The food was just gone. It had never been meant to last indefinitely and it wasn't going to.

We finally agreed on rationing: a pound a day for each of us. After that, my belly was a constant grumble of discontent. I tried to soothe it with an occasional snack of leaves and twigs. Once I invaded a nest of ants. Both times I got sick and my belly merely hollered more painfully. I told it I was sorry but it wouldn't listen. A lot like Sylvia in that respect.

Most evenings, around dusk, whenever they could manage to penetrate the static barrier, Henryk and Cindy buzzed us. Talking with them had become a painful process. We were depressed because of the food situation and they weren't feeling much better. Whether their problem was grief over the probable loss of beloved elders or simple disappointment at the apparent failure of their project I was never able to tell for sure. Even

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Cindy didn't seem to be the same person any more.

Henryk was nonetheless full of suggestions, several of which he was bold enough to cast to the airwaves. At one time, he thought we ought to head for the chain of mountains we had vaguely glimpsed at one time. There might be life there and, in any event, it couldn't be worse than the constant rock and ash. I reminded him that, because of his policy of sheer survival, we didn't even have a compass. Not being able to tell which way to turn, we weren't likely to be able to find a chain of presently invisible mountains. Later he suggested we try to reach the ocean. That time I contented myself with cursing him up and down as a malicious idiot. He didn't say much in reply; maybe he thought I was on the right track.

On one occasion, he did take a stab at defending his policies. "We felt we had to force you to learn how to survive without depending on us for anything. We wanted to establish a colony on the Earth, not a dependency. We had to force you to learn to live."

"Well," I said, dripping sarcasm. "We did learn."

"You bet," Sylvia chimed in. "We learned how to die."

After switching off the box, we usually ate our one pound of meat, then collapsed into a vague, dreamless sort of sleep. Sometimes, however, the Moon would suddenly appear in the night sky and when that happened neither of us slept; we just sat straight up and stared right above and sniffled and moaned and wept and tried to act as if the other was not there to see and hear.

Three days before the food was scheduled to run out and one day after we'd reached a final deadlock on the question of halving the ration- one vote in favor, one opposed--we suddenly ran into the pig.

I nearly laughed out loud seeing it. I could've cried just as easily. We had passed the summit of a small hill and were about to descend the opposite side when I looked up and noticed there was something very big standing in our path. It wasn't a rock.

I grabbed Sylvia's arm. She stopped and glared at me. I said, as softly as my voice would allow: "Look there."

She looked. She squealed. Hastily, I slammed a hand over her mouth. The last thing I needed was for her to start acting goofy and female all of a sudden.

"None of that," I cautioned.

She bit my finger.

I let go.

The pig was twice the size of the animal I remembered from old Earth. It had a pair of massive, curled tusks jutting out of its pink little mouth, a coat of thickish gray hair, and a big bushy clump of a white tail. Seeing it, I didn't see a

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

pig, familiar or otherwise. I saw several hundred pounds of raw meat. My belly exploded in a symphony of plaintive rumbling.

"Get around behind it," I told Sylvia.

"Me? What's wrong with you? What if that thing turns and charges? Those tusks would tear me in half."

"Or me," I said, logically. "There isn't time to argue--just do as you're told. Go."

"Nope," she said. "If you want it, McMurtry, you go."

"Then I'll also eat it all," I threatened.

"You're bluffing."

"Want to bet?"

She sighed. "No, you bastard. Knowing you, I know what it means to be selfish."

"Then get."

I had convinced her of the rightness of my views. She backed off, taking the one long knife Henryk had permitted us, then turned and stalked over the crown of the hill. I fastened my own gaze upon the pig. By this time he had seen us and I wanted to try staring him into a state of passive submission. But he glared right back at me from tiny, nasty, pink eyes.

When Sylvia reappeared, she was properly downwind from the beast. I observed her movements from the corner of one eye. She crept cautiously down the hill, her body bent close to the ground, her arms swaying underneath. As she continued, I also moved forward, taking one step for every two of hers, flicking my gaze from the pig to her, then back again. I tried to force the thing to keep its attention riveted on me. It gave an ugly snort. It dug a rear foot into the hard ground. When I was ten yards away, I came to a halt. I renewed my steady glare. Sylvia slipped around behind. Now we had the pig exactly where we wanted him, neatly trapped between. Only one problem remained: what the hell were we supposed to do next?

A gun. A sword. A couple additional knives. That was what rankled me the most. Sure, survival was important but it didn't have to be suicide. I carefully surveyed my personal armory: teeth, fingernails, fingers and fists. I looked at the pig. I thought he winked at me. I sighed. I shivered. Then I shrugged.

Sylvia wiggled an impatient finger at me.

With nothing else to do, I stepped forward. Sylvia came too.

My plan, such as it was, was to catch the pig in a vise, allow Sylvia to attack unseen from the rear, then move in myself to help finish the job. Alas, it didn't work out that way. We were both maybe two yards from the pig when he suddenly got wise. Deep within those beady eyes, a comprehending light dawned. He sniffed the air. Abruptly, he spun completely around with incredible grace and faced Sylvia. Startled and scared,

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

she jumped back. His worst suspicions now confirmed, the pig let out a high, ugly snarl. I could guess what he was thinking. Here he was—good, honest pig—playing the game fair and square and according to the rules, while all the time this sneaky slink of a woman was creeping up from behind. The pig was stupid and we were treating him so. And he didn't like it—not one damn bit.

So, without further prelude, he did another graceful turn, then lowered his big head and charged straight for me.

I said me. Why not Sylvia? I don't know. Maybe the pig—way down in his fatty heart—was a chivalrous beast.

In any event, I didn't stand a bloody chance. The pig caught me dead in the chest and I went unceremoniously over on my back. I saw the long tusks rise. I rolled. I felt something pierce the soft flesh of my side. I screamed. The pig gave a grunt and bowed his head. I was about to be gored to death—my internal organs stripped and revealed.

Meanwhile, as the pig and I fought our unequal struggle, I did some fast calculating. I saw it this way: we had—Sylvia and I—six pounds of meat left to us. At the present rate, that would mean three more days. If Sylvia ran away and allowed the pig to dispose of me, that would mean six days for her alone. If, on the other hand, instead of running, she elected to pitch in and help kill the pig, then the six pounds would be increased by the weight of the pig and we both might eat (and damned well) for several weeks.

I frankly thought those were pretty good odds. I tried communicating them to Sylvia but if she heard me over the pig's bleating and snorting she gave no sign. Or had she run away? What if I was alone? Deserted? Fated to die at last after one hundred and fifty-nine mostly good years?

The pig had removed its tusks from the flesh of my side and was now trying to gouge a hole in my chest. Luckily, my squirming was sufficient to hold him off for the moment.

Then I heard a thunderous roar and knew it wasn't the pig. Sylvia? A moment later a great weight was lifted from my chest and I knew it was—yes—sweet Sylvia. I staggered away, bleeding from my wounds, and looked up to see her—like a bearded and breasted cowpoke—mounted upon the pig's back. Her hand rose and fell, clutching the big knife. After a couple unsuccessful thrusts, she struck home at last. The pig's neck spouted deliciously red blood. It gave a gurgle and Sylvia leaped aside. The pig collapsed to its knees. A bit later, it fell over and flopped on the ground. Sylvia stood up. The pig flopped again, then lay still.

"Dead," I managed to murmur.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

"Dead!" Sylvia cried, rushing over to me. "We did it! We killed it! We survived!"

In spite of the pain I was beginning to feel in my side, I smiled. Sylvia was right. We had survived—so we had. Sylvia was acting as proud as any kid after shedding his or her virginity. I had to admit I felt almost the same way.

When Henryk and Cindy called that evening at dusk, Sylvia and I bragged like a couple of proud parents. I had downed a good ten pounds of pig (raw) and Sylvia wasn't running far behind. My wounds proved to be nothing much. Henryk pompously suggested the application of certain roots and herbs to the infected areas. I told him he wouldn't learn anything about the Earth of today from reading hundred-plus-year-old survival manuals. I said experience was what counted and, besides, there weren't any roots or herbs around here.

"But there has to be," he insisted. "Our telescopes plainly show large areas of greenery. Why haven't you—?"

I ticked off a few reasons for him. "For one thing, we don't know where we are. For another, without a compass, we don't know where we're going. We might be walking in circles in the middle of the Siberian tundra. If you hadn't been born an idiot, this problem would never have arisen."

He didn't appreciate my ideas. Sylvia, on the other hand, laughed like a mad hoot throughout.

The moment we finished talking, like a programmed bell, the Moon came out and rang its pretty message in our ears. Sylvia and I fell silent, pretending to watch the yellow face. I knew we were both doing some heavy thinking. For myself, my thoughts were second thoughts, but I managed to beat them down. I knew what had to be done and that this was the best (maybe only) time for doing it.

Dulled by the pig she had consumed, Sylvia soon drifted off. I pretended to do the same, waiting patiently until I was positive she was not faking too.

Then I got up and stalked softly across the land. I glanced up once toward the Moon and whispered, "Cindy, don't look. This has to be done—I'm sorry—but you're not going to understand."

I reached Sylvia's side, crouching silently. I looked at her. For the first time since we had landed, she had failed to remain vigilant. She slept with both eyes firmly shut to the world.

The knife lay nearby. I didn't care to use it. No, sir, years ago I had vowed to kill Sylvia Komorowski with my own bare hands and that was what I then proceeded to do. I choked the life out of her. Don't think I enjoyed doing it. No, I did not. But I had my reasons—felt it was right and fair—and knew it had to be done now.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

When I was finished, I staggered away. Oddly, I fell asleep almost at once and slept soundly too, not waking till morning. My dreams were not pretty things. When I finally roused myself, I rolled over and noticed that something was missing.

It was Sylvia. Dead or not, she wasn't there. And not only that: the hag had taken the whole damn pig carcass with her. And the knife.

She had left me the radio and the six pounds.

I knew she was alive. Maybe I had known it all along. I looked down at my hands which only a few hours before had stood guilty of murder and I cursed them for cowardice in the face of the enemy. Then I switched my direction and started cursing the whole damned uncooperative universe. I included Sylvia, Henryk, Cindy, even myself.

But it was funny. Not a one of those curses made me feel the least bit better. The universe was still there, I was alone, and Sylvia was alive. After all those years of waiting for revenge, I had found my moment, then blown it.

I was a murderer without even the satisfaction of a victim.

IX

If I tried to relate the full details of how I managed to sneak into Commander Komorowski's office that night so many, many years ago when, strangely enough, the lights throughout the colony failed for the first and only time in history, it would take more space to tell than everything else put together. Suffice to say it was a complex, tangled endeavor and I pulled it off slickly. I got into the office. I looked through the files. I opened the safe. It was there I found the message taped to the bottomside of a half-empty bottle of whisky. I downed the whisky and read the message. It did nothing except confirm the worst of my suspicions. I shook my head, clicked my tongue, laughed, shoved the message in my pocket, and got out of there fast.

The next morning—first thing—I commenced my whisper campaign. I made a determined effort to select my subjects with great caution. I told no nuts, idiots, or madmen. I would corner some healthy young technician—a fellow bursting with the rigors of self-control—and read him the purloined message. Or a young lady engineer, slim of chest and tight of lip. Or some shaky, middle-aged, long-haired physicist. I picked carefully. I knew my campaign could go in either of two directions, in the second of which instances I would end up with my neck stretched. The other way I would be king.

It took less than two days to find out the answer. I was working on the campaign, prowling the bottom-level corridor near Komorowski's office, when I came to a corner and heard a noise from the other side. Without needing to look, I knew

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

the exact significance of that noise. I hope I paled. I hope it turned my stomach.

To be truthful, I hadn't had much personal experience in such matters. In her final years, the Earth was a tranquil place, but my maternal grandmother had lived through the troubles in Ulster and, as a child, I had been exposed on a daily basis to her stark, detailed recollections of those times. I knew it was the same thing now. I could hear it, smell it. Pounding feet. Shouting voices. Sweat. Fear. Low, angry murmurs. The walls around me seemed to radiate a suppressed hate all their own.

I stopped dead still, realizing it was I alone who had caused this. I had the message in my hand that moment. I could have cried with shame.

Finally, I forced myself forward. Turning the corner, I stopped and confronted the mob.

They were armed. That was the first thing I noticed. It meant they were sufficiently serious as to break into the sealed armory. It also meant Komorowski's personal guard was either dead or else part of the mob too. The sight of so many weapons being waved so casually in the air sent shivers racing along my spine. Knives. Beamguns. Even rifles. And—of course—plenty of sticks and homemade clubs.

I knew the men in this mob. I had spoken personally to most of them. I saw healthy young technicians, slim lady engineers, long-haired physicists.

I stepped in front of the mob, held up my hands, and shouted: "Now hold on—wait—I never meant—!"

It was like talking to a dumb animal. In fact, that's exactly what it was: a big, stupid, senseless, irrational jungle beast. I could no more have stopped that mob than I could have prevented a bull elephant from entering my habitat if that was where he wanted to go.

This mob didn't care about my habitat: they—it—wanted Komorowski.

If I didn't get out of the way, I knew the mob would simply kill me. So I fell against the wall, let the initial ranks stream past, then slipped into the mass. Inside, I tried speaking to individual men. It was a useless process. There weren't any individuals in there—just parts of that jungle beast.

I remember grabbing a man—a Russian engineer named Ivanov—and shouting: "Look here. They were on your side. They were your allies. You can't blame them because—"

He didn't even look at me. In a lifeless voice, he answered, pointing ahead: "He killed my wife. My brother. All my children. Now I will—I must—I will kill him."

"No!" I cried, but that was pointless too. The message I had stolen—the few words which had started it all—dangled uselessly

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

from my fingers. I dropped it. I let the mob trample that thin sheet of paper. The message was quite simple. It was a report dealing with the chemical attack which had led to the end of the Final War. It mentioned very little Komorowski had not told us. There was one thing: the source of that attack, the country which had launched it: Poland.

We had reached the door to Komorowski's office. I was sure it was locked, barred, and sealed. Beneath our combined weight, it popped open like a saltine cracker. Our ranks poured through. I couldn't have turned back if I'd wanted. I was inside the office with everyone else. I heard someone scream. It might have been Komorowski and it might not. Suddenly, I looked up and there—bare inches from my own face—was Komorowski. He was hanging upsidedown in the air. His mouth was open in a silent scream. His eyes gazed blankly into mine. I tried to say I was sorry. It was a sight I'll never—even if I live to be a thousand—forget.

Then he was gone.

When I found him again—it was much later—he was dead. I had to guess the body was his: it looked more like a slab of chopped meat.

The mob was not satisfied. Another angry rumble grew, as if the mass mind was seeking a new subject upon which to vent its senseless rage. Me? The bearer of bad tidings is never a popular figure. I guessed it was time to get out of there.

I had nearly reached the door when something said I ought to look down. So I did. I saw a small desk which had somehow managed to survive the mob and, cowering underneath the desk, a tiny figure. It was Sylvia Komorowski.

I felt I owed old Komorowski something. Crouching down, I motioned Sylvia to be silent, then helped her to her feet. Together, we headed for the door. I tried to shield her from the mob with my body.

Then we got lucky. Up front, a heavy voice started shouting. Then someone else screamed in sudden pain. A new victim had been selected. Howling gleefully, the mob swept forward. I grabbed Sylvia and we darted out the door.

In the corridor, we passed a few people. They looked at me shamefaced, as if they were embarrassed to be seen going about the routine tasks of their days. I had nothing to say to them. Their guilt could never equal my own.

I kept Sylvia hidden in my cavern for the three days during which the mob roamed. Only rarely—when hunger got the better of me—would I venture out myself. At the end of the three days, twenty-two men and women were dead. After Komorowski, other Slavs—Hungarians, Serbs, Czechs, even a few Russians—were slain. An American named Gorbe, whose ancestors had

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

probably left their homeland a hundred years before, was brutally torn apart. The worst thing about the mob, it seemed to me, was the way everyone participated. That is, Zigon would help kill Hajek and then, when the mob turned upon Zigon, Nemec would be right in there helping and, had Hajek not been dead, he too would undoubtedly have been in there, lending a hand.

I suppose it's a lot like a bottle of warm beer when you shake it. Something has to blow. Our colony had been shaken by the inexplicable destruction of our own world. Not until I came around with my stolen message had a viable way of blowing up been revealed. When it came, everyone had grasped at the opportunity and the mob had been born.

I spent the three lonely days in my cavern doing a lot of thinking. I knew I had been taught an important lesson and it was my duty to comprehend the totality of that message. Geologists, physicists, engineers, soldiers, astronauts: a colony of brilliant men. But just that: *just men. The point was we were* all sadly vulnerable. And, if all of us were that way, then none of us was much better than any other. That meant there was no valid reason why I should continue to let them push me around. I threw away my broom. I made my plans. Then, when the rioting was finished and everyone was busily sulking in their own guilt, I moved in and set up the world I wanted to live in.

Komoroski had been our dictator but I didn't think we needed another like him. As far as I could see, we didn't really need any ruling elite at all. We were few in number. We were intelligent, trained, educated, rational. We could manage our own lives.

But, while this was certainly true now, would it always be true? In a place like the Moon colony, where survival is a precarious business, the margin of error must be kept right at zero.

So, therefore, to protect ourselves, I suggested we learn how to police ourselves. I suggested clans—self-regulating family units, interdependent, for intermarriage would surely occur—with none inherently greater than another. Each clan could set up its own internal structure—dictator, council, pure democracy—that would be strictly their own business. I pulled a sheet of paper out of my hip pocket and showed it around. I had divided our current population into an even dozen clans. As the years passed and our numbers increased, the clans could then fragmentize until each represented, as much as possible, a single family unit. The clans would be expected to police each other. If one got too far out of line, it would be the responsibility of the others to step in and say no. To further this aim, the

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

possession of firearms would not be regulated.

I received little argument. After the riots, nobody had much heart for protest. The day after my presentation, I posted a request for everybody to move into his or her own clan. I included a map establishing definite geographical boundaries between the clans.

Then I tried to fade from sight. I didn't want anyone getting into the habit of depending upon me. I took care of my own clan but, otherwise, kept my nose out of the way.

Surprisingly, it worked. After a few initial wrinkles, the clan system took hold. I was damned proud of myself.

The one main thing I had failed to take into account was the population explosion that immediately gripped the colony. But the prompt institution of the feuding custom took care of that. As long as the population stayed down, feuds were few and far between. Once more, I was damned proud of my own ingenuity.

Meanwhile, I had been following a few routes of my own. Most particularly, I had been supervising the erection of a still. A couple of fellow clansmen, chemists, gladly pitched in and helped. The men down in the gardens cooperated nicely in growing the required grains. It wasn't too long before we were drowning in rotgut. The excess—what little there was once our own thirsts were quenched—was traded to other clans for goods we needed.

I've got this to say: as a life, it wasn't bad.

Oh, there were problems. To imply otherwise is to lie. It's too easy—glancing back at a dim yesterday—to overlook that which is not uniformly warm and pleasant. I don't want to do that. I prefer honesty. There were plenty of difficulties and one of the most irritating—if not most serious—was little Sylvia Komorowski.

Naturally, I took her into my clan. She lasted three years, earning everyone's enduring hate. Then she came to my cavern and told me flat out if I didn't let her go she was going to kill herself. I smiled and waved and said, "*Bon voyage.*" That night, she sneaked into my private liquor room, broke the still, and destroyed a month's supply of booze. I found her in the morning, drunk and laughing.

After that, I traded her off to the Bandinis for one of their little girls. Sylvia lasted almost two months with them. They didn't trade her—nobody would strike a bargain—they had to give her away. She lasted three weeks in her new clan, then moved again. And again. Six clans in hardly a year. She wasn't treated badly. In fact, everyone was extra polite and kind no matter how vicious her sniping. Finally, she came back to me. Or was sent back. Taking her in, I delivered a

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

long lecture on the subject of how she was going to have to behave because I was being awfully fair giving her a second chance. She smiled and nodded and I was damn near certain she had learned her lesson and was ready to turn over a new leaf.

That same night, she penetrated a series of supposedly unbreakable locks, entered my liquor room, and broke everything in sight. I found her in the morning, drunk and laughing. *Déjà vu*, they call it.

Of course, I dumped her.

I can't really say that Sylvia was mean. Or bad. And certainly not evil. She was simply nasty. She never inflicted physical injury and rarely violated any clearcut customs. But nobody could stand her. Man, woman, child. Sylvia had the rare ability to say invariably the one exact thing any particular person especially did not want to hear. Usually, what she said, it was the truth.

So she got the boot.

She ended up, finally, with the Shinoda clan. With infinite Oriental patience and a fortunate inability to understand either English or Polish, they managed to bear her weight. On her sixteenth birthday, she fought and won her first feud. Al Lincoln—forty-five—a first-rate shot. Sylvia stunned his brains cold. When I tried to interfere, she nearly creamed me too.

In three years, she won feuds with seven men and three women. I don't know what she thought she was proving. One thing, at night, she never had to go to bed hungry.

When she turned twenty, she challenged me. I hadn't seen her in six months or more when little Robbie Shinoda delivered the message.

I decided to go and see Sylvia and have this out once and for all.

I found her in the Shinoda habitat, where she had managed to grab off a good-sized cavern of her own. As soon as I entered, she informed me I was now standing on Komorowski territory. She had fragmentized and established her own clan. Was I going to try and stop her?

I laughed and said no.

She glared at me fit to commit mass murder on my body alone.

I shrugged and sat down across from her.

"Look here," I said. "I know what all this is about and I came here for only one purpose: I want to tell you I'm sorry. I know that's not enough. It won't bring him—"

"Huh?" she said. "Bring who?"

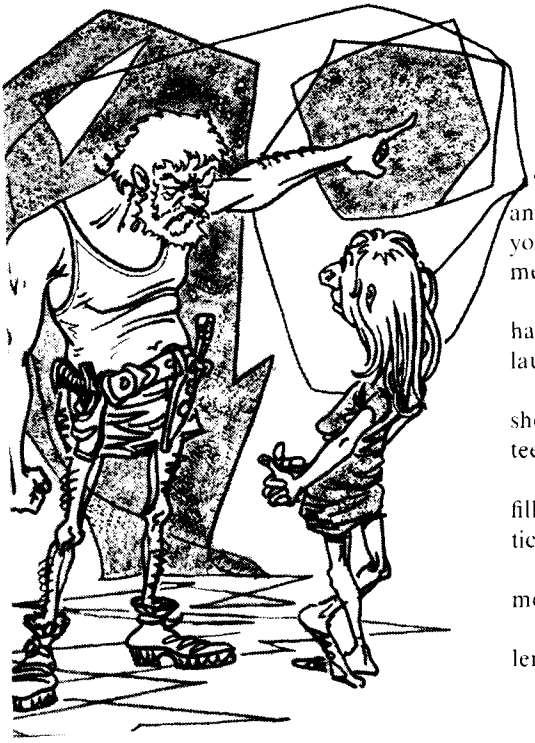
"Why, your father, of course."

"What about him?"

"Why, I killed him."

She seemed genuinely startled: "You did?"

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED



I decided I had better tell her the whole story. I tried to be as frank and honest as I could, leaving nothing out. There was no way of knowing what version she might have heard or how many times she had been told it. I finished: "So I can readily understand why you would hate me and, again, there's nothing I can do except say that I am sorry."

"I never heard a word of any of that before," she said.

"What?" It was my turn to be startled. "Then why do you hate me?"

"Because you saved me."

"What?"

"From that mob. You had to go and carry me out of that room. If you hadn't, they would have killed me. And that's what I want."

I did something then I should have known better than to do: I laughed at her.

"I swear I'm going to kill you," she said, between clenched, angry teeth.

"Oh, no, you're not." I'd had my fill of her stupid, adolescent romanticism.

"And how do you intend to stop me?"

"By not accepting your challenge."

"You can't do that."

"I am. It's refused."

"Then you're a coward."

I shrugged.

She screamed: "You bastard! You dirty, stinking, yellow bastard!" She jumped to her feet.

"Maybe I am," I said.

She spat in my face.

Which is where the whole thing should have ended.

The fact that it did not is, I suppose, largely my own fault. Or, more specifically, the fault of my palpitating little heart. By the way, that is meant to be amusing: palpitating little heart. Enjoy it while you can, for the truth is that what now follows is not, in the least little bit, amusing.

I went and did what I had

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

vowed never to do: I fell in love.

The name of the lady was Jenny Kingman. English—and not very pretty. Her chin sloped inward and her nose sloped downward and her dull gray eyes were so lacking in personality she used to paint monstrous black circles around them before I told her to knock it off.

I didn't care how Jenny looked as long as she looked like herself. Maybe that's the whole point of being in love. I loved Jenny Kingman as a person—not because she approached some vague ideal of beauty I had fixed in my mind's eye.

We courted in the manner established among us by custom. Jenny's father was an original colonist—a geologist—but she was young and had never known Earth. I think I loved her even more for that. Within a month I had asked her to say yes and she said yes so I went to her father who also said yes and he approached the clan elders who added the final yes.

Jenny and I set a definite date. I laid plans for the biggest, most glorious wedding feast in the history of our little world.

In spite of the apparent futility of such activities, many colonists still carried on with their original tasks. Astronomers scanned the skies and geologists collected rocks. Jenny followed her father's interests and often went exploring the Lunar surface. Sometimes he went with her, sometimes she joined large parties, and sometimes she went out with only a friend or two.

One time she went out with a friend and did not come back.

I was one of the group who found her lying at the bottom of a deep chasm. She had broken her leg falling and, unable to move, had died from suffocation.

I sat down beside her body and cried.

When I reached the colony again, I went straight to the Komorowski clan and broke into Sylvia's private cavern. I found her seated on the floor. Standing above her, I demanded she accept my challenge to feud.

Sylvia Komorowski was the single friend who had accompanied Jenny on her final journey.

"No," Sylvia said.

A large crowd had gathered around us.

"You murdered Jenny," I said. "You went out with her and deliberately pushed her off that cliff. Then you came back and pretended she had wandered away. You killed her and now I'm going to kill you."

"I won't fight," she said.

"Then deny it," I said. "Deny what you know you did."

"I won't deny anything to you," she said. "I asked you to fight me long ago and you refused. Now I am refusing you. There was a time when I wanted you to die and wanted it to be my hand which

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

killed you. But now I can see that you're already dead, in spirit if not in body, and ending your life would only be a blessing. I won't be the one to do you that favor—you'll have to go find somebody else."

I jumped at her then, murder in my heart. The crowd pulled me off, but it took twenty of them.

I was under sedation in the colonial ward when the inquest occurred. Sylvia was absolved of any blame. Jenny had wandered off. Fallen. Died. And that was it.

And so it was—at least until the day when I woke up aboard a space shuttle and discovered Sylvia Komorowski sleeping nearby. Did she do it? Kill Jenny? The truth is that I did not know. All I can say is that I thought she did—that I was ninety percent sure—but I did not know. On the Moon, we lived together. Her clan soon challenged mine in terms of size and power and prestige. Naturally, we clashed—but never physically. She refused to fight me and I had long since given up any intentions of fighting her. I suppose if one of us had conveniently died, the mess would have been settled. But that didn't happen. In the gentle gravity of the Moon, we both kept right on living, as if to spite the other.

And now, as I think back on those bygone years, I cannot help realizing how thoroughly sick I had become of living. Perhaps there ought to be a law—a limit set on the number of years any man can live. Make it a hundred—even sixty or fifty. I think we all ought to agree to sign an oath in blood stating we will do away with ourselves after so many years. What's the point in living so long it becomes too long? Look at me. When I was thirty I did some great and awful things. Now I'm one hundred and fifty-nine and, looking back, I can see how the last hundred of those years have been nothing but dull paragraphs of postscript tacked onto the tail end of the real story. What a sad, damn, stupid waste.

I wonder if Sylvia feels the same way.

That day on Earth, while swallowing the last bites of my six pounds of meat, I wondered the same thing. In order to find out, I decided I'd just have to go and find Sylvia and ask her.

And there was another reason for wanting to find her: if I didn't, I couldn't very well kill her again.

X

The next day I passed over a small hill and found, on the other side, what really could have been a new world entirely, one bearing almost no relation to the Earth I had already seen and known. The moment I succeeded in convincing myself that this was more than a bizarre mirage—that it might actually be real—I sat down and placed my hairy face in my fuzzy hands and cried like a child.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Why? I don't know. Maybe I was thinking of Eire.

No matter. The place was green. When was the last time I had seen anything like that? The long grass flapping in the gentle wind? The busy trees? And—yes. I made myself hurry down to see—flowers too.

I went to a clump of what appeared to be tulips, threw myself down in the grass, and thrust my nose right into the middle of them. I got a huge noseful of fragrant flower scent and it was hardly enough.

I was in a valley. Opposite me, a low range of hills tilted up, concealing whatever might lie beyond. I couldn't tell if the valley was all there was—an oasis of heaven laid smack upon the charred Earth—or if it was only a hint of further wonders yet to come. For the moment I knew I'd have to stay where I was. There were several small ponds of blue water sprinkled across the landscape. I went to one and drank. Crouched down, I could clearly see—deep down in the pool—the slim thrusting shape of a long fish. In spite of the previous day's stuffing, I was hungry, but there was no need to fish. The valley was stocked with game more thickly than a zoo. I saw many deer, herds of them, some with high, tall splintered antlers. And there were squirrels, chipmunks. And birds. Insects—countless ants, beetles, grasshoppers, crickets.

The valley hummed with the combined noise of all these beasts, great and small. It struck my ears like a great song—a symphony of life. I guess, like a kid, I started crying again.

That evening, when Henryk and Cindy called, I was tempted to pay them no mind. My belly was full of juicy deermeat—the thing had let me club it to death without even trying to flee. The symphony of noise continued unabated. I felt carelessly at ease. What did I need them and their damn hassle for?

But I answered anyway: habit.

The day before, when they'd called, I'd told them straight off about Sylvia's thievery. Of course, Henryk promptly turned a switch and laid the real blame squarely on me.

This time Henryk started the conversation off on a similarly foul note: "Well, have you found her yet?"

I answered truthfully: "I really haven't been looking."

"Does that mean you've come to your senses?" I had also told him about my intention to do a little killing. Henryk didn't think that was a sensible attitude.

"I haven't had time," I said.

"What does that mean?" He made no effort to conceal his suspiciousness.

The question, however, should have provided me with the right opening to tell the story of the valley. It was, after all, the place we'd

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

been hoping to find all along—a spot of Earth where men could live without constantly worrying about sheer survival.

But I said: "I've been trying to hunt up a bite to eat."

"No luck?" He affected concern.

"None."

"No more pigs?"

"Not a one. I think the one we found was a freak—the descendant of a circus animal. This isn't Europe or Asia—this is America. And that was a wild boar."

"How do you know it's America?"

I knew because the valley told me. I said, "A hunch."

He muttered a few words about hunches, then asked. "And no sign of Sylvia?"

"Nope."

"She may be dead, you know."

"I hope not. If she's dead, I can't kill her."

"McMurtry, you are a fool. Do you want to be alone down there?"

"I thought I already was."

He sighed and faded and then Cindy came on. We chatted innocuously. I guess I was finished with her and knew it. This hurt a little—but not a whole lot. Henryk was young and I was old. He was there and I was here. I could hardly blame Cindy for choosing him over me. The girl was always a pragmatist.

Finally, I got rid of them both and settled back to enjoy the sunset. I couldn't actually see the sun, but the clouds—which seemed almost as white and fluffy as those I recalled hanging from the Irish sky—turned neat, brilliant shades of red, gold, and brown.

So I was staring at the sky, watching this colorful display, when the noise of something whimpering attracted my attention.

Peering across the dusky land, I spied, at the edge of one of the ponds, a pack of tiny dogs milling in a mass. They seemed plainly intrigued by some unseen object lying in the middle of them. Some were snapping at the others and most were snarling. One—a pup—was doing the whimpering.

I decided I had better investigate. To be causing such a commotion, the unseen object was probably food, presumably meat, and I didn't want any of that lying around. I had deposited the remains of my own deer carcass in one of the pools. I did not care to have the odor of blood and flesh attracting any so far unseen, big predators.

As soon as I approached, most of the pack scampered away. I booted aside the stubborn remnants and looked down.

It was a carcass, all right.

At first glance I thought it had to be Sylvia.

I was ready to raise my head and howl an awful lament, when I looked a second time and saw it wasn't her. The dogs had torn the body to shreds but the head was

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

still largely intact. The face and skull were as hairless as a rubber ball. The cheeks and jaw were bare. The fact was the head was just too typically human to be either Sylvia or me.

It was someone else. A stranger.

I inspected the body more intimately, seeking some sort of clue. Around the neck, tightly woven, I found a three-inch strip of leather. I knew it: Sylvia's strap. It had to be. The belt she had used to haul our stores across the land.

And now here it was tied around this stranger's neck. Had she put it there? Sylvia? Had she strangled him?

Leaning back, I scratched the top of my head. I felt like one of those spacemen in the old stories who used to zoom through space. I was spaceman McMurtry, having just stumbled upon intelligent life on an alien planet.

Who would have thought? The planet was Earth: the life was human.

It was getting too damn dark to learn anything else tonight. I didn't even have time to dispose of the body. I ran back toward the hills, seeking shelter, but night caught me halfway. I decided to stay where I was. I crouched close to the ground, more afraid than anytime before. It wasn't the wild dogs that scared me. I guess I could handle them. It wasn't the unseen carnivores either.

No, sir. It was man who scared me: sweet old *Homo sapiens.*

But he always had.

XI

As soon as dawn cracked the eastern sky, I stumbled awkwardly to my feet and took a hasty glance downward to ensure that I had come through the night intact. Then I tottered away. At the foot of the hill, the dogs had returned to nibble at the carcass. Once more I chased them away, but there was little remaining this time of my mysterious friend: just a pile of chewed bones and Sylvia's leather strap. I removed that and tied it around my own waist.

Then I stepped away from the carcass and began to walk in a circle.

I hadn't gone far when I found what I was looking for: footprints—and plenty of them. A whole mob had trampled through here. The ground was soft, the earth moist, and the prints showed as clearly as a fly squatting on the tip of an Irishman's red nose.

It didn't take me long to make up my mind. I was going to follow them. I couldn't be sure who had made the prints and hadn't the slightest inkling of where they might lead. But Sylvia was with them—I was ninety percent sure of that—and where she went, I was going too.

So I went back and fetched the radio, then sped off in pursuit.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Moving quickly, I kept my eyes fastened to the ground. Except for a few rocky places where I lost them momentarily the prints remained true and clear. A light breeze whipped around me. The odor of fresh flowers rippled through my nostrils. I paid none of this a meager mind. I was McMurtry the bloodhound—and there was scenting to be done.

The trail soon took me out of the valley, through a narrow pass between a pair of green hills. I lost the trail here for a while but kept my faith alive and soon found it again. I passed through another valley, as green and fragrant as the first, and soon left that one to slip through another pass and finally down into a third valley. Ahead of me a high range of snow-capped peaks came clearly into view. The trail remained constant and I began to guess my destination lay somewhere up there. Night caught me halfway across the third valley, so I chose to rest there. The next day I plunged into the bowels of a series of increasingly higher hills. Things were less green—boulders and rocks began to predominate. I stuck to my trail, losing the prints, finding them again, losing, finding. Game remained sufficiently plentiful and no more afraid than before. Killing was as easy as falling off a narrow bridge. I ate damn well. The mountains slunk closer and closer. Usually, about the time I paused to sleep, the radio buzzed.

Automatically, I reached out and answered. Habit.

Each time Henryk asked me what the hell I thought I was doing.

The first time, unafraid, I had told him: "I've picked up Sylvia's trail."

"Thank God. Then she is alive."

"So far," I said.

"What do you mean by that?"

"Just what I said."

"McMurtry, don't be a—"

"Why not?" I said. "There's no problem. I can dispose of her in any number of ways. Crack her over the head with a rock. Run a stick through her belly. Cut her wide open with a sharp stone."

"You brought it on yourself," he said—a phrase I've always loathed.

"No, sir," I said in sharp reply. "She brought it on me first."

He was too young to know about Jenny and I didn't have the heart to dirty her memory by placing it in close proximity to his ears.

By the fourth night the hills had grown high enough so that I felt a definite chill as soon as the sun fell. The mountains were very close now; the white peaks extended high into the sky. When the radio buzzed, I came closer to saying the hell with it than ever before.

But a habit was a habit.

Henryk said, "McMurtry, I'm going to warn you. If you harm Sylvia, if you do one thing to injure her, I swear I'll—"

I laughed loud and long. "Go

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

ahead. You'll do what? Come down here? Fix me? Henryk, I'd love to see that. You down here. Eating bugs. Drinking filthy water. Staggering under the hot sun. You come down here and you won't live a day."

"Is that a threat, McMurtry?"

It hadn't been intended as such but I couldn't resist: "It's a promise."

The next day I finally reached the end of my trail.

I passed over the rocky tip of a high crag and there, squatting demurely on the other side, was the place. It wasn't much to look at: maybe three dozen adobe huts arranged in irregular lines. I could see a few people moving about, but hit the ground before making a closer survey. I had seen enough to know they were men and it was men I had been following. That's all I needed to know.

I crept away from the natural trail I had been following and found a sheltered ledge on the hillside where I could get a good view of the village. I took a closer survey of the people. In spite of the cold, most were naked or dressed in ragged skins and belts. And they were ugly. Hairless. Bronze. It took me a hell of a time to figure out exactly what it was I was seeing. When the answer finally came to me, I laughed aloud at the bitter irony of it.

No wonder these people were funny looking. They belonged to a culture thought to be long extinct.

They were native American aborigines: that is, they were Indians.

Call me Cowboy McMurtry, I thought, continuing to laugh.

XII

Night fell and I still hadn't seen Sylvia. The sky above was pitch black but down in the village a few fires were already burning. At my side the radio buzzed frantically but I was managing to snap the habit this time. To hell with you, Henryk Komorowski. You may accompany him below, Cindy McMurtry. What you're seeing is a busy, busy man: stay clear of his path.

Creeping carefully from my hideaway, I returned to the main trail and wound a cautious path downward. If Sylvia wasn't down there in the village, I was making a sorry mistake. If she was, then I didn't have much choice. Because I didn't yet know which was which, I had decided to take the harder path. I could have waited—but waiting was not for me.

The fires, I should have explained, burned from inside the buildings. But the light was sufficient so that I could see my feet and that was enough to make me happy for the time being.

With a plop, I touched level ground.

Then it was only a matter of continuing forward. I laid the radio—which had momentarily ceased

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

to buzz—at the mouth of the trail. Then I sprinted across a stretch of dry, flat land and threw myself against the back of one of the huts. There were no windows here, so it was necessary for me to slink around to the front.

Perhaps half the buildings were lighted. The street was empty. I had seen no evidence of life as I came down the hill and began to wonder if there was a reason for the Indians' reluctance to venture out at night. What if they had good reason? Some big carnivore native to these hills. My spine began to tingle. I had to force myself almost physically to stop from turning and running and fleeing.

Slowly, carefully, I recovered my confidence, thinking, "No matter how big you are, monster, my name is McMurtry and I'm meaner and smarter."

Well, it sounded good—and my spine did cease to tingle.

Going to the nearest lighted hut, I laid an eye against the window—actually a big gaping hole in the wall—and peeked through.

There was one room, crowded as hell. I counted bodies: eight men, six women, three children. All were asleep upon the dirt floor. A torch had been thrust into a hole in the farthest wall. Another man—awake and alert—paced softly beside this wall. I ducked back before he saw me.

Sylvia hadn't been there.

So I stepped along the street—if it could be given such a name—and tried the next hut.

The scene was nearly identical to what I had just left. The guard this time was an old man. Like the first, he was not armed. And, again, no Sylvia.

So, once more, I moved on.

At the fifth hut, I found her. She lay in the middle of the floor, between bodies, sleeping the serene slumber of a guiltless babe. The guards this time consisted of a pair of boys. Just my luck, they were holding sticks.

Slipping back out of sight, I considered attempting to acquire a weapon of my own, but then decided no. If I wanted to do this right, the main thing was to be quick and sly. No stick or rock I might pick up would be sufficient to beat off their numbers once roused. If I wanted to save Sylvia, I would have to do it with brainpower. I would outthink this bunch.

The only problem was: how?

I thought on that one a long time. I knew I needed a plan and kept considering various ideas. I'd discard the worst points from each concept, retaining only those factors which seemed wholly valid. I was trying to build a superstructure and at last decided I had exactly what I needed:

The perfect plan.

I stood right in front of the big hole of a window. I threw back my head. I tickled my vocal cords

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

into action (I never mentioned my hobby, I guess—I sing bass) and let loose the most magnificent bellow that land had heard in years.

Then, putting my strategy into final effect, I pounced through the window with a limberness pretty impressive in a man of my age. The two boys saw me, looked at each other, shrugged, then stepped forward. I cursed them for spoiling my perfect plot. They kept on coming. One spoke—of course, I didn't understand. He raised his stick. With a mighty thrust, I knocked it out of his hand. The other boy stopped in his tracks, shook his head at me, turned, and lit out. The only difficulty was—in the single-room hut—there was no place for him to run.

But, by this time, the rest of them were also wide awake.

And that included Sylvia.

She had shaved off her hormone-induced beard and I had to admit, even in the excitement of the moment, that was an improvement. I went right for her. She held up her hands, cowering back, pretending not to know me. Or maybe she did—and guessed what had to be up. In any event, I grabbed her arms, pulled them down, and pointed at the open window.

"Get!" I shouted.

Two of the Indians—women—had hold of my back. A boy wrapped his arms around my legs. I shook all three of them off like a wet dog and screamed at Sylvia again.

She shook her head weakly, then suddenly smiled. "McMurtry!" she cried, as if noticing me for the first time.

"The window!" A man wrapped his arms around my legs and tried to bring me down. He was damn strong and I only saved myself by stepping on his fingers. "Get out!" I continued to shout. "Run!"

"Oh," she said. "Oh, sure." She started for the window, strolling like a beauty queen on parade. Fortunately, nobody tried to stop her; they were all coming at me.

I fought desperately till I saw her step through the window and disappear into the night. By that time, there must have been a dozen of them hanging onto me from various places.

Sylvia was free. But if she was to be safe, she'd need me to guide her away. I had to get rid of these people—and fast.

So I kicked my feet. I swung my fists. I rolled my head and shook my entire body. Men and women flew off me like fleas from a sprayed dog. I didn't pause. Turning, I ran for the window. I left the ground a yard from the opening, diving headfirst. I sailed through the window and hit the street hard.

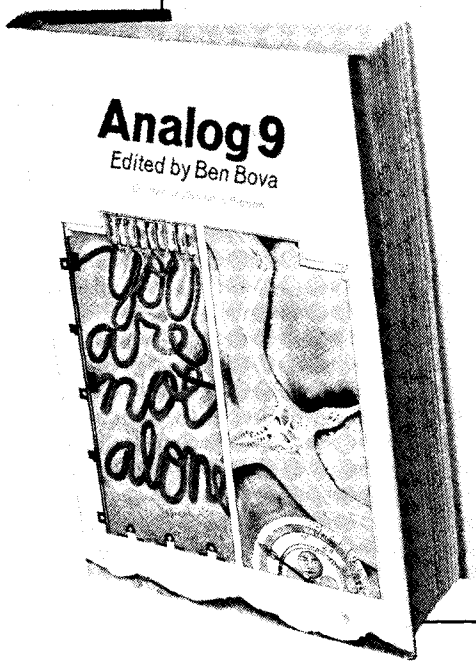
Rolling to my feet, staggering only a meager bit, I shouted: "Sylvia!"

Her voice was right on top of me: "I'm here, McMurtry."

I grabbed her arm and pulled

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

ANALOG 9
America's most exciting science fiction anthology!



This ninth anthology of the best stories from ANALOG features outstanding science fiction stories originally published in the magazine from 1970 through 1972; the last two years of the late John Campbell's editorship and the first year of Ben Bova's. Contents include:

THE GOLD AT THE STARBOW'S END
by Frederik Pohl

THE MISSING MAN
by Katherine MacLean

HERO by Joe Haldeman

THE PLAGUE
by Keith Laumer

OUT, WIT!
by Howard L. Myers

ANSWER "AFFIRMATIVE" OR "NEGATIVE"
by Barbara Paul

Condé Nast Books Dept. A9
P.O. Box 3308, Grand Central Station, New York, N.Y. 10017

Yes, send me ANALOG 9 for only $5.95 (plus 45¢ for postage and handling). I enclose ☐ check or ☐ money order for $6.40. If for any reason I am not delighted, I may return the book within 5 days and my money will be refunded at once.

NAME_____

ADDRESS_____

CITY_____ STATE_____ ZIP_____

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

her along with me. The windows of the huts we passed were filled with dark faces and staring eyes. We raced between two huts and I tried to find the trail.

Any minute, I knew, they would come pouring after us.

I found the right place at last and stopped only long enough to grab the radio. Then we ran. Sylvia kept falling back, complaining that she needed sleep. I wouldn't let her rest. It seemed to take all night to reach the top of that first hill. Then we went down, still not stopping, and up again.

On top of the second hill, Sylvia finally said: "No more." Sitting down, she crossed her arms. In the dark, her figure was little more than a vague shadow.

"But they might be coming," I said. "If they catch us out here, we're through. If—"

In reply, she snored.

Faking or not, I couldn't wake her. Finally, seeing no easy alternative, I lifted her in my arms and carried her to a safer location. A stand of trees sheltered us. I laid her down, then sat beside her.

Exhausted as I was, I couldn't sleep. My mind pulsed like the active core of a volcano. It seemed as if every problem I had ever faced was suddenly transmuted into words. I had to solve them all. I worked like a devil. I knew it was either now or never.

The night seemed to take forever before it finally ended.

When dawn came at last, I was there to see it.

XIII

As soon as Sylvia began to give indications of waking, I went softly over and picked up a big jagged rock and brought it back and held it above her head.

"You better say your prayers," I said.

She sat up cautiously, knowing better than to make a false move. "Not again," she said.

"This time I won't miss."

"Is that what happened the other time? You missed? Why, I thought you just got scared."

"Of what?" I asked.

"Of having to put up with my ghost."

I smiled quietly and merely repeated my vow. "This time I'm going to kill you first."

"Do you think they'll let you?" She pointed behind me and, like a jackass, I turned, expecting to see the Indians. They weren't there—nobody was. I managed to wheel back just in time to get a horse-laugh in the face.

"Very funny," I said. "But this isn't a joke."

As if in reply to a cue, the radio started buzzing. Sylvia looked longingly in that direction but I told her uh-uh.

"He can't help you now," I said.

"I don't want him."

"No, but you may need him. We're nearly even now, Sylvia. We

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

weren't before, so I couldn't kill you. My brain may not have known that but my fingers did and they spared your life. But a rock can't do that. It can only do what gravity says it should. You saved me from the pig and I saved you from the Indians. So the slate's almost clean. There's only one big debt left to discharge."

"Jenny," she said quietly.

"How did you guess?"

"After all these years"—she shook her head—"you're still carrying that grudge bottled up inside you."

"It's not bottled that deep. You killed her."

"And if I said I didn't, would you believe me?"

"I would not."

Then, out of nowhere, she smiled. "But you're mistaken anyway, McMurtry. The slate still isn't clean—Jenny or not. You still owe me my life. Know why? Because to save a life it has to be endangered. And those people—those Indians—they had no intention of harming me."

"But they were Indians," I cried.

She laughed. "Where did you get your education, McMurtry? From old cowboy movies? Those Indians are Pueblo Indians, the Nañu. We're in—by the way—New Mexico. It was in the ruins of an old army base that we landed. After you tried to strangle me, I woke up and managed to crawl away. The Nañu found me lying in the dust half-dead and gave me water. Somehow I got my senses back, sneaked over to where you were sleeping, and took what I needed. I went with them. They're hunters and gatherers. But they're not killers. There's so few people left in this world that they cherish each person for who he is."

"They sure didn't act particularly friendly last night."

"Would you? If some nut raided your house and stole one of your women away."

"But you killed one of them." I told her of finding the dead man with her belt around him. I explained how I had followed the trail from there to the village.

"That was a Navajo village. They have survived too. We were only resting there. Nañu Pueblo is still about two days farther up in the mountains."

"But you admit you killed that man."

She laughed. "You sure have a high opinion of me. No, he died. From natural causes. Lucky for me because it made an opening in the Pueblo. I left my belt with him—it's a Nañu custom—as a gift. To thank him for dying so that I could assume his place."

It was my turn to laugh. "You expect me to believe that?"

"For God's sake, McMurtry, I'm not Jack the Ripper. I don't kill—" She stopped and sighed and shook her head. "I can't see any point to arguing with you. Your mind is

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

made up. You want to kill me. So I guess you'd better just go ahead and do it."

I nodded tightly and lowered my jagged rock.

But I stopped.

Her eyes were shut. "Kill me," she murmured.

I lowered the rock a bit farther but once again stopped. "That's what you want me to do. You told me once—I remember—long ago."

"What does it matter what I want? You want it too."

"I'm sick of your self-pity."

"Then put an end to it."

The rock came down a long way this time but once more it stopped short of her skull. I looked down at its jagged lunar surface and at the crown of her head waiting beneath. I could tell it was useless to try.

"Oh, hell," I said, and threw the rock aside.

Sylvia gazed up at me with a strange look that seemed to say that she had expected something else. "Why did you do that?" she asked softly.

I shook my head and dropped down beside her. "You knew I would."

"I wasn't a hundred percent sure."

"But near enough."

"Yes."

I held up my fingers. "And maybe these knew, too. They did the other time—they knew to stop."

"Lucky for me."

"Yes," I said, "lucky for you. But do you know why—not why the other time but why this time?"

"Because you're a lot of things, McMurtry, but you aren't a killer of women."

"Oh, I could be. The day Jenny died I could have killed you without a second thought."

"That was a long time ago."

"Yes, but there's another reason too and I want you to know it. Do you realize how close I—we—came to letting it start all over again? That's what happened on the Moon—that's what went wrong. We took the quarrels which had destroyed the Earth and transferred them intact through 240,000 miles of space. They killed your father. The old hatreds. And, when we got tired of them, we invented some new hatreds of our own, and now you and I were bringing them down here. A full circle: from the Earth to the Moon and back again. And it was wrong." I folded my hands deliberately over my chest and stared far off into the distance.

Sylvia nodded but did not speak. For myself, I was content simply to look way out, at the horizon, beyond it. I was seeing a new world out there—a virgin land—a place new and yet unbearably old as well. Perhaps I was seeing a new life as well.

My life. Born again after a hundred and fifty-nine years of waiting.

Finally, I stood up. I pointed off toward where I had been looking

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

and said, "I'm going now."

"Where?" Sylvia asked.

I pointed at the radio, which had started buzzing anew. "That is yours—if you want it."

"No—where?" she said.

"I don't know."

"Noplace."

I shrugged. "Oh, I'll find someplace. There must be other people. Indians. Who knows? I'll find them."

"I'm going back to them. The Nañu. Now that I've given up my belt, I don't want to reject my chance."

I nodded and started off, walking purposively but not with haste.

I heard her call, "Wait!" and she came after me.

I stopped.

She came around in front of me, panting with the suddenness of her pursuit. "McMurtry . . . are you sure . . . you won't—won't come with me?"

I shook my head firmly.

"A grudge?" she asked.

"Yes—maybe." But I knew she deserved an explanation. "I can forgive—but not forget. If we were together, it would never work. That thing—the past—it would always be with us."

"I didn't kill her," she said.

"But I thought you did."

"And that—?"

"Yes. That is what matters."

She nodded, understanding, and then murmuring, "Wait," stepped away.

I watched as she went over to where I had thrown the big jagged rock. She picked it up awkwardly in her hands and carried it over to where the radio sat buzzing. She stood over the box, raised the rock, then let it go.

The radio went *smash*.

Then she waved at me.

I hesitated only a moment. My hand went up. I waved.

Then it was time. I turned around and trudged off, my eyes fixed to the ever expanding horizon. ■

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

the reference library

Lester del Rey

SF—AND OTHERWISE

In the last fifteen years, many of the newer writers of science fiction have been preoccupied with the mainstream—or at least that elitist element of the mainstream deemed worthy of respect. And most of us have been informed by our critics that we should all try to come up to the high standards of writing to be found in that mainstream. All we need is the effort and talent to master the high skills of "good literature" and we can be accepted beyond the limits of a mere genre or category.

I'm sure most of those critics would be surprised to be told that science fiction (and some fantasy) is one of the most difficult disciplines to master in the whole field of writing. Yet I found this to be so, in a sort of reverse fashion. After years of writing science fiction, I turned for a while to other fields—and found they were child's play by comparison. There were no alien beings to flesh out and make believable, but only normal humans; there were no complex backgrounds to describe and detail—without interrupting the story—but only the world the readers already accept. In fact, more than half the work of creating and writing a story could be eliminated. Even historical novels rested firmly on a background which the reader was ready to accept.

Science fiction needed a discipline and set of techniques that had never been required before, if it were to present totally alien cultures, histories and worlds without long, obtrusive explanations that halted the flow of the story. Evolving such techniques was a slow and painful effort, as can be seen by reading most of the very early stories of the field. Try to imagine *Dune* or a Le Guin novel as it might have been written in 1930! Personally, I don't think such stories could have been written without later techniques.

And while the writers were learning, it seems to me that the readers were also becoming more sophisticated. They have learned to plunge into a new world at once, setting aside their preconceptions and adjusting quickly to the world they find. They don't need a frame around a story to show how a man reached the future or another race came to be. They can accept.

There are quite a few signs that both mainstream writers and readers have been mastering the techniques of our field—while our writers have been groping back to the old ways.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

A case in point is Richard Adams' **Shardik** (Simon and Schuster, 604 pp., $9.95). It's listed simply as "A Novel" on the jacket, but in every essential except perhaps for gadgetry it is science fiction. It's obviously about an alternate world and history, but it plunges into the story directly, without preamble, just as a good SF novel should do. (It might be fantasy to many, but there is no magic or supernatural element; hence the development is much more like science fiction. There aren't even any talking animals.)

Briefly, it deals with the Empire of Bekla, where there is an ancient belief that the Power of God is sometimes symbolized in the figure of a bear. (The people don't expect it to perform miracles or grant revelations. They know perfectly well that it is still a bear. Yet the appearance of such a beast enables great events to happen. This is a fine philosophical concept that must be read in detail.)

Kelderek, a simple hunter from a primitive frontier of the empire, escapes a forest fire to an island where a huge bear has also fled. He expects to be killed by the burn-maddened beast; when he is not, he is convinced that Shardik, the bear, is the current avatar. The last one appeared many years before, and in the interim, Kelderek's people have lost control of the empire and been reduced to near savagery. Now once more they can hope to regain their rightful place. Kelderek manages to convince others of his belief, including a marvelous old priestess of the strange cult, and they set about the quest for power.

That quest takes them through lands that are excellently conceived and into strange places and cultural pockets. It also involves a peculiar relationship between Kelderek and Shardik. The bear remains a real and believable bear, without any humanizing or divine manifestations. Yet his influence dominates much of the story. And the poor beast has enough troubles to wring blood from a heart of stone. Kelderek has his own difficulties—not the least of them after he seems to have achieved his goal.

For once, I agree with the blurb on the jacket flap: "a gripping tale of war, adventure, horror and romance." But it's a lot more. It's also a fine philosophical quest for the real meaning of the Power of God (as quite distinct from God).

I've heard from some who saw the book in advance that it is a "hard read"—a dense and demanding book, though a rewarding one. I think those who have spent their apprenticeship in science fiction will find it much easier to follow, however. The abrupt plunge into the story and the world of Kelderek, the taking of another history and culture for granted, and the techniques of narration as a means of revealing all this to the reader are ones that have become familiar in our field.

(Adams, as I discovered in a brief conversation with him, is indeed a reader of science fiction and fantasy.)

It's a long and complex story, but I found it an engrossing one.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

In my opinion, it's considerably better than Adams' *Watership Down.* It's going to be a best-seller, of course—on the strength of Adams' reputation. And it should help to familiarize more readers with the need to enter alien cultures without a preamble or lengthy explanation. Maybe more will be able to enter some of our classics afterwards.

For the science fiction reader willing to forego rocketships and space wars, it should also prove a fascinating book. I recommend it as one of the best novels of the year.

Another good example of the technical mastery of a complex story is **The Birthgrave,** by Tanith Lee (DAW Books, 408 pp., $1.50). This is sold as science fiction—and at the end, proves to be truly science fiction, even though the beginning of it seems to be pure fantasy.

Or maybe I shouldn't call it fantasy—maybe by this time the use of strange powers (psi carried to its ultimate) has become science fiction by general acceptance. At least here the psi powers are delineated fairly early in the story and never used as tricks to get the heroine out of her troubles—in fact, as in all good psi stories, the basic problems center around psi, rather than being dispelled by it.

This is also a complex story into which the reader is plunged without prior buildup. Along with the main character, he has to discover the world as he goes along.

The heroine here is nameless through most of the story for very good reasons. This can be a very clumsy device, but Lee carries it off smoothly, and it's a nuisance only in reviewing the book. Anyhow, Heroine wakes up in a cavern under a volcano, to be told by a flame—Karrakaz, the Soulless One—that she has been preserved after all her race are dead, and that she lives on as an embodiment of all the evil of that race. And she is accursed, doomed now to go forth and wreak evil upon the world. Only when she finds "the Jade" can she become whole.

She has very little memory of anything that happened before her awakening, and what she remembers comes mostly in the form of distorted dreams, apparently relating to her very early life. She manages to get out of the caverns, just as the volcano erupts. Pursued by flame and lava, she makes her way to a group of crude peasants, who recognize her as their goddess, and give her a mask to cover her face. She finds herself beautiful of body and very ugly of countenance, so she welcomes the mask. But being mistaken for a goddess has risks—until she discovers she really can heal the sick and wounded—and that she can also heal her own body. In fact, she seems to be unkillable.

From the peasants, she is abducted by Darak, a wild and lusty bandit, who manages to conquer her and make her love him. And he is surprised to find that she quickly masters the arts and skills of a warrior. They visit a ruin of the Old People—apparently the race from which she comes, long dead,

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

who held all other races as slaves and less-than-human.

During the next few months, just about everything happens to her that possibly can—except that she doesn't regain her lost memory, hard as she searches for the clues to it. She's warrior, witch-woman, wife and goddess among a strange people who try to ape the ways of the Old Race and recognize her as one of that race. She's a pawn in intrigue—and strangely, always guarded by three men; when one group of three disappears, another group appears to be her total slaves. And disaster follows her wherever she goes, striking at her enemies and friends indiscriminately.

I can't entirely agree with the blurb, which indicates that Lee ranks with Le Guin, Brackett, and Norton. The novel stands on its own, with its own mood and color. But there is a great deal of vigor to the writing, and some of the scenes are outstanding. There's a chariot race sequence that is better conceived and executed than I can remember from any previous work.

The writing, despite the fact that we follow a heroine who doesn't understand her world or herself fully, is clear and lucid. The characterizations are satisfactory, even for some of the minor figures in the novel. For instance, as her groups of three change, each has its own feeling though each is different from the one before. And the cultures and scenes through which she moves are drawn with quick, sure strokes that bring them alive before the reader.

In the end, the glimpses of

ANALOG COVER REPRINTS

ANALOG, Dept. AC
PO Box 1348, Grand Central Station, New York, N.Y. 10017

APRIL 1974 _____ copies JUNE 1974 _____ copies
OCTOBER 1974 _____ copies AUGUST 1974 _____ copies

Please send me copies of the 1974 cover reprints as shown above, @ $1.75 for each individual cover; $2.50 for each set of two; $3.25 for each set of three; $4.00 for each set of four.

I enclose check _____, money order_____. (No cash or stamps.)

Please send me _____ set(s) of the 1973 cover reprints, at the special discount price of $3.60.

Name _____

Address _____

City _____ State_____ Zip _____

Please allow four weeks for delivery. Only a limited supply is available. Offer good only in the United States and its possessions.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

science fiction devices we catch at times are brought forward, and we finish with a novel that is genuinely science fiction. And yet, I'm sorry to say that this is the weakest part. It all fits together, and everything is explained. But there's a bit too much *deus ex machina* (literally *ex machina*) about it. I wish it could all have been solved more closely within the initial postulates of the story, without the intrusion of things over which she had control, but about which she didn't know—or have reason to know.

Nevertheless, the novel has far more virtues than faults. It moves surely, remorselessly at times, with a momentum of its own. The plotting could be routine—but it never is. There's nothing obvious about it. Villains and heroes are never so simple that they deserve such labels. Nothing follows by pulp-plotting axiom from what has gone before. No pattern of development is predictable from other stories it may sometimes resemble.

Lee has done a quite remarkable job of writing. This is an outstanding novel of strange adventure.

And finally, to get away from science fiction and on to science fact, there is **The Curve of Binding Energy,** by John McPhee (Farrar, Straus and Giroux, 232 pp., $7.95). This is a book which deals deeply and well with the dangers of the way we are handling plutonium, the most dangerous substance known to man, probably. But it does a great deal more.

The book is sometimes repetitive and rambling in its organization, and there are times when I wish scientific facts were made a bit more easy to follow for the general reader. But mixed into it is the quite remarkable portrait of a scientist named Theodore B. Taylor, who seems to be a genius of the type usually confined to science fiction. Without nearly enough formal education in the field, by usual standards, he seems to have invented more types of atomic devices than most of us have ever heard of. He really should be a character in a Heinlein novel.

The book is also a good source for information on the wonders of our former Atomic Energy Commission and the development of atomic power since the days when science fiction predicted all of it—except for the politics and human confusion.

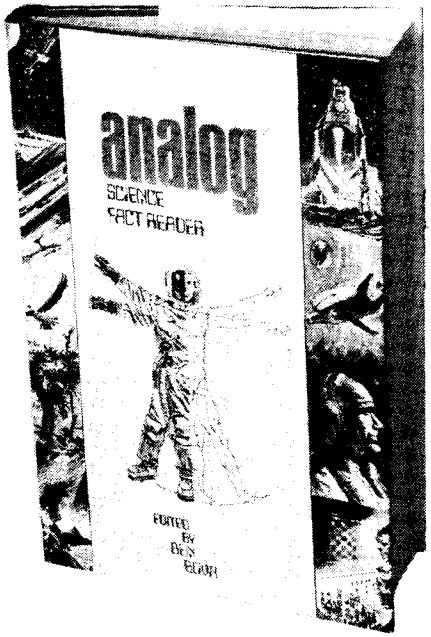
It's sometimes useful to find what really happens to our ideas. And for that, this is an excellent book.

Note from the Editor:

Here's an item of interest to the science fiction fan who's also a movie-goer. It is the three-volume **Reference Guide to Fantastic Films: Science Fiction, Fantasy, and Horror** (Walt Lee, PO Box 66273, Los Angeles, California 90066). It sells for $9.50 per volume; $29.40 for all three volumes.

This is the most complete listing of SF films in print. Factual details of literally thousands of films that should be invaluable to every student or fan of SF movies.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED



analog science fact reader

Here are a dozen of the most provocative, future-oriented science fact articles from ANALOG, collected in book form for the first time! An ideal way to view the scope and breadth of today's research and its effects on tomorrow's world.

1st time ever offered!

Great articles by famous authors:

- Giant Meteor Impact—by Joe Enever
- The Hydrogen-Oxygen Car—by William Escher
- Real Science for Real Problems—by John R. Pierce
- The Third Industrial Revolution—by G. Harry Stine
- Robots, RAMS from CAMS—by Thomas Easton
- How to Design a Flying Saucer—by Richard Rosa
- Alpha Wave Conditioning—by K. C. Keefe
- The Computer Was a Fish—by George R. R. Martin
- It's Right Over Your Nose—by Ben Bova . . . AND MORE!

Condé Nast Books Dept. AR
P.O. Box 3308, Grand Central Station, New York, N.Y. 10017

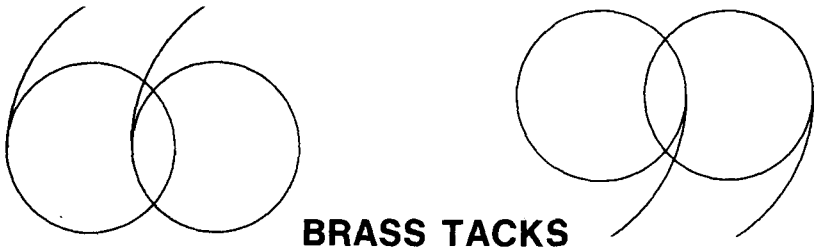
Yes, send me ANALOG SCIENCE FACT READER for only $7.95 (plus 55¢ for postage and handling). I enclose ☐ check or ☐ money order for $8.50. If for any reason I am not delighted, I may return the book within 5 days and my money will be refunded at once.

NAME_____

ADDRESS_____

CITY_____ STATE_____ ZIP_____

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED



BRASS TACKS

Dear Mr. Bova:

I am confident I shall neither be the first nor the last to direct your attention to the inaccuracies in the illustrations for the story "To Be Or Knot To Be," by Alecs Baird, in the April, 1975 issue: neither the sheepshank nor the bowline, as illustrated, will do their intended jobs (if, indeed, they are intended as nautical knots). A pull upon either will cause it to untwist and disappear.

Of course, these observations in no way alter their inherent and flagrant obscenity. On the contrary, since it cannot be argued that a redeeming social value exists, even for nautical purposes, the immoral and degraded nature of these two illustrations must be readily apparent, even to members of a Senate committee.

We all owe a debt of gratitude to Mr. Baird for directing our attention to these depravities.

HOMER K. SHANKS, JR.
1903 Oakline
San Antonio, Texas 78232

On this knotty subject, our position is flexible: we don't want to get roped in, but we don't want to be uptight about it, either.

Dear Mr. Bova:

Although no match for the heights of reading pleasure achieved in January, your April, 1975 issue was generally quite satisfying, particularly as regards the shorter fiction. Unfortunately, while the tendency in recent months has been toward higher quality, your lead novelettes are teetering on the brink of unreadability. Case in point: Brenda Pearce's April "Crazy Oil." This particular gem is a potboiler jammed tight with stereotypical characters, purple prose, and gosh-wow dialogue, nicely topped off with a terminal case of "said-bookism" (*i.e.*, avoidance of the speech-tag "said").

The plot is a variation of the "Bury - Them - Underground - With - No-Hope-Romance-Them-And-Dig-Them-Out-Again" shtick, with a poignant punchline thrown in for flavor. The cast of characters forms the usual space-faring exploration team: hardened but humorous captain; cynical old scientist; young lieutenant, brash and bold, token

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

foreigner who lapses into his native language when under stress (he is often the engineer; *vide* Star Trek's Scott); insecure (and now impotent?) but brilliant newcomer-scientist; and finally, of course, the token woman, who is conveniently given a job which provides her with plenty of spare time to act as nurse/cook/antagonist. It is Katherine, naturally, who tends to poor, injured Engineer Schultz, who responds to Cap'n Redwood's cheery, "Be a love and rustle up some tea" with alacrity.

Gosh-wow dialogue? How about: "The cap—it's blown out of the borehole's collar as though by an explosion! What inconceivable force would have done that?" The descriptive prose—notably the passages in which the scaphe "(swims) upward like an untethered mountain"—require the cutting power of a machete to afford even the most hardened reader easy passage. In addition, Ms. Pearce must learn to handle her speech tags; I'm sure she is causing Mr. Atheling to spin in his grave. We find the characters (especially Davidson) "snapping," "barking," "retorting," "bawling," and "rasping" right and left; it's a wonder they have time to say anything.

While I have never been a fan of your technologically oriented fiction, I much prefer the skillfully plotted and smoothly written stories of Jerry Pournelle, for instance, to meaningless "Man vs. Glop" blatherings like "Crazy Oil" or the equally sloppy "Tharsis" stories by Bob Buckley. I am even more interested in your light and "sociological" fiction; a recent example would be Benford's "Doing Lennon," or last year's wonderful "And Keep Us From Our Castles," by Cynthia Bunn. I did find the April offerings (with the exception of "Crazy Oil") well worth reading, and, more importantly, worth the dollar cover price. You could do your readership a great service by extending your standards of quality to situations where you are faced with quantity as well.

PETER MANDLER
1406 La Jolla Knoll
La Jolla, California
I like Pearce's conception of the surface of Venus. And her characters.

Dear Ben:

I enjoyed your April debate on the National Health Insurance issue. Both men (Dr. F. Paul Wilson and Dr. Alan E. Nourse) gave a good condensation of what one can expect on each side of the argument.

I thought you might be interested in a generalized opinion from a consumer research group, whose focus is exclusively on the question of government medicine. Citizens for Quality in Medicine began as a study group. We gathered materials on two issues: the experience with government in other countries, and the evidence on both sides of the claim about an American medical crisis.

It would be impossible to detail in a letter the reasons and evidence for our findings to date, so I'll offer your readers a single suggested source to verify most of our conclusions: A book, *Hazardous To*

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Your Health, by lawyer Marvin Edwards (Arlington House).

The research to date includes:

1. Using a present-compared-to-recent-past method, or a United States-compared-to-other-countries method, the United States is the most advanced now in terms of medical skills, tools, and facilities, and in terms of delivery of medical care to all segments of the population (not to mention to the world through emergency organizations). Some of the claims by United States Senators and others about infant mortality comparisons are based on a World Health Organization brochure that clearly states the reasons why it is not a valid statistical comparison between countries. Other claims of an American medical crisis are less intellectually fraudulent, but are mostly emotional in appeal, rather than factual.

2. For those countries which have adopted government medicine there have evolved years' long waiting lists for many kinds of medical attention, epidemics of children's diseases, such as hearing loss, a decline in pharmaceutical research, a stagnation in construction of medical facilities, a skyrocketing cost for medical care both for the nation and the individual through taxes, and an emigration of the skilled doctors from those countries that did not hold them by force.

3. The partnership between the government and the AMA allows an artificial limit on the entry of doctors to the American public. This shortage creates a near-monopoly situation, with the classic result of higher prices and little effort to keep doctors' training up-to-date. The ideal protection of the American medical customer is open entry to the medical profession with a competition among voluntary accrediting or licensing associations. The larger number of doctors would reduce medical costs. And medical customers would look for a certificate of accreditation issued by an association whose standards and requirements of doctor skills, regular updating of study and skills, drug prescription practices, et cetera, were publicly published and backed by a solid reputation. Competition between such associations would keep quality constantly available to the public. But it can only be achieved by breaking the bond between government and the favored AMA.

In the mountain of materials we gathered we saw a rising voice among professionals in opposition to government regulation and financing of medicine much as there has been against its industrial regulatory agencies (ICC, CAB, FCC). Among these are detailed articles in *Reason* magazine and a book by a Chicago University economist and others examining the net loss of FDA "protection."

The two articles you published in Analog illustrate perfectly the kind of debate going on. The dull, dry facts are on the side of free market medicine. The emotional crowd-moving rhetoric is on the side of government power. Today when the nation's intellectual leadership is arguing against government med-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

icine as a cost-raising, quality reducing phenomenon, we ought to think twice about letting our political leaders establish another bureaucracy. Bureaucracy usually stifles any opportunity for change, for eliminating costly programs and trying other alternatives. As usual the politicians lag behind the scientific or economic evidence.

PAUL BEAIRD
National Director
Citizens for Quality in Medicine
Box 2724
Kodiak, Alaska 99615

I wouldn't call Dr. Wilson's anti-NHI piece "dull, dry facts"!

Dear Mr. Bova:

National Health Insurance legislation will eventually be passed, but like Dr. Wilson, I wonder if it's necessary.

Most Americans have no problems paying the bills for routine medical care. I've never understood why anyone should complain about a ten- or fifteen-dollar physician's office visit when auto and appliance repairs, plumbers' rates and so on are (almost) unflinchingly paid. To stretch the comparison a bit, most heavy cigarette smokers, including many poverty-level citizens, will spend several *hundred* dollars a year for their habit. How can anyone not be willing to pay *for* his health?

As Dr. Wilson pointed out, poor patients and the elderly already have government coverage, and most middle- and upper-class patients do have private insurance. Some better plan *is* necessary for patients with lengthy hospitalizations which Medicare or private insurance does not fully cover. Families may be financially ruined by one member's illness, and plans must be drawn up to prevent or relieve these crises.

Dr. Nourse correctly states that availability of medical care for all is a critical problem, although I fail to see that NHI will correct physician maldistribution. Health care is already undergoing a revolution: medical-school graduates are turning toward primary care and away from subspecialization in growing numbers. More family practitioners are setting up rural offices than ever before, although it will be many years before every small town in the United States is sufficiently doctor-staffed.

I might add that family practice is the first specialty to require recertification by examination every seven years, and many other specialties are following suit. Most hospital medical staffs will eventually make mandatory the certification and recertification of their members. The Federal Government may require "the boards" of every physician who participates in NHI. The need to recertify will do more than anything to assure continuing medical education—whether or not Washington is involved.

The immediate crisis in American medicine is the malpractice insurance issue. Some of the nation's best practicing physicians may have to close their offices because of their inability to meet exorbitant malpractice premiums.

Whence American medicine? I don't know, but one day I may

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

very well advise my kid to repair TV sets for a living.

WILLIAM AMEEN, MD
Halifax Hospital Medical Center
Daytona Beach, Florida

The immediate crisis in American medicine is the low number of physicians per patient, a ratio deliberately kept low by the American medical profession.

Dear Mr. Bova:

. . . If anyone is in doubt how a National Health Insurance system, such as the one currently before Congress, will work, he need only track down a copy of *That None Should Die* by Dr. Frank G. Slaughter. Although it is somewhat dated, it shows quite graphically the results that could occur under a politico-medical bureaucracy. If this is the kind of lemonade Dr. Nourse has in mind, I find it a bit sour.

For those who may not have heard about it, I would like to point out the Health Maintenance Organization (HMO) concept. Basically the idea is a preventive medicine group plan. When one enrolls in one of these plans, he is contracting with a group clinic for all or some (depends on the plan) health care benefits including such things as prescription drugs, periodic checkups and major medical treatment. This is paid for at a specified rate, depending on the proper preventive medicine, thus reducing or eliminating major medical outlays and improving the general level of health. It also provides a more stable arena for medical practitioners since income levels are known. If anyone would like more specific details he need only look around his area for a HMO clinic. (I understand local laws sometimes make this concept unworkable, so they may not exist in all areas of the country.)

Where does this leave the poor person who cannot subscribe to this? Let us return to Dr. Slaughter's book for a moment. In the Warren Plan, state and local governments pay the bills of people below a certain income level. Under a HMO system, persons or families below a certain income could have all or part of their premiums paid through the existing Medicare or Social Security Systems, if not through some local setup. Thus a HMO clinic should still have the income and the poor would get their medical care.

This plan may not be the answer to all the medical problems in this country, but I find it preferable to another all-out Federal program with the usual . . . high costs and petty restrictions.

ROBERT L. SMITH
1832 East 8th Avenue
Olympia, Washington 98501

And what is the answer to the exorbitant fees charged by doctors--especially under various insurance plans?

Dear Mr. Bova:

Regarding the National Health Insurance debate. From a strictly forensic standpoint I think F. Paul Wilson presented a better argument; certainly he had more facts that were new to me. But I have to side with Alan Nourse, at least insofar as advocating some kind of

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

change in the health care delivery nonsystem of this country. It is not just the obscene costs and inequitable distribution that disturb me; I have long felt there was something immoral in the notion that people should pay, sometimes to the point of bankruptcy, for being sick. And there simply has to be something wrong with a system that allows an *entire profession* to ask, "What recession? What unemployment?" while the rest of the country staggers on the brink of economic chaos. I will admit to a slight case of sour grapes here—at this writing I am effectively unemployed . . .

SIMON P. EDKINS
25 Waterbury Avenue
Stamford, Connecticut 06902

Increasing medical costs have been a consistent factor in the double-digit inflation that's plagued the American economy.

Dear Mr. Bova:

I thought you didn't print fantasy. F. Paul Wilson's article on National Health Insurance, though, was either fantasy or a satire along the lines of Swift's "Modest Proposal." I will not repeat what Alan Nourse said in his excellent article. Nor do I think that National Health Insurance is a panacea for solving all the nation's health problems. I would, however, like to point out some of the most glaring inaccuracies in Wilson's article.

Dr. Wilson suggests that if the United States lags behind other countries in the life expectancy of its citizens, it is only because "a staggering number of us die from causes unrelated to disease." Apparently someone has neglected to inform him that these "causes unrelated to disease" also operate in the countries where life expectancy is longer than here—that in Sweden, for example, people also die from accidents in cars or at home or in factories, and even from personal violence.

Dr. Wilson asserts that the rise in the cost of medical care "compares favorably with the rise in the cost of other services" during the period 1960-1970. Maybe so. According to my copy of the *World Almanac*, though, medical costs in the period 1965-1974 rose faster than the average worker's weekly wages. Most people, I believe, pay their medical bills out of their wages, not by trading other personal services. Furthermore, Dr. Wilson's equation of expenditures on health care with expenditures on gasoline is absurd. A motorist who finds that he is paying too much for gasoline can always cut down his driving, but a hospital patient cannot dismiss himself from the hospital and go home when he finds that costs are mounting beyond his ability to pay.

Next, there is Dr. Wilson's statement that the poor and elderly already have their health care expenses taken care of through Medicare and Medicaid. This is not quite true. The Medicare program (which was bitterly opposed by many doctors who use Dr. Wilson's arguments) does not cover many of the medical expenses of those over 65, and the Ford Administration, at that, is trying to weaken the coverage. As for Medicaid, to be eli-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

gible for this program one must literally pauperize oneself, not only by divesting oneself of savings but, in most states, by going on welfare. The disincentive to work or save contained in the Medicaid program can well be imagined. What about low-income working persons who run up medical and hospital bills for thousands and tens of thousands of dollars, and whose health insurance, if they have any, does not fully cover their bills? Such things do happen in real life and are not just concocted by the media. Is it Dr. Wilson's opinion that such people should just drop dead?

What makes me think that the whole article might be a spoof, though, is the following quotation from it: "Doctors are a maverick breed and notoriously unorganized." As I cannot think of a single interest group in American society (with the possible exception of lawyers) that is more effectively organized for its own interest and protection than doctors are through the AMA, I am completely at a loss to understand what he means, if he is writing seriously. Dr. Wilson has either completely mastered the Orwellian art of double-think or else he is one of the outstanding writers of humorous fantasy in the United States today.

J. KEVIN BRANIGAN
75 West Squire Drive
Rochester, New York 14623

Causes of death unrelated to disease include traffic accidents and violent crimes—both of which are symptomatic of social and psychological diseases that neither our medical nor political establishments have treated. But Dr. Wilson is right when he says that the AMA is not as tightly organized as, say, the Teamsters Union, the Newspaper Publishers Association, the John Birch Society or the American Communist Party.

Dear Editor:

Please allow me to comment on the debate on National Health Insurance. Let me say right off that my position is closer to Dr. Wilson's than Mr. Nourse's. But there is a significant difference between Dr. Wilson's and my defense of his conclusions: it is my considered *judgment* that NHI is morally indefensible. Let me elaborate.

NHI deprives people of their honestly earned income, and in consequence the options in life they have created for themselves (and in terms of which they could enhance their one life here on this earth) so as to give this income to others who may or may not have the perfectly respectable goals to achieve with it. But that is plain theft. Never mind that such theft is widespread. That is no argument for it, only a sad comment on our civilization. The fact remains that theft is immoral, that it undermines the capacity of those who make their living honestly to further their own happiness, to make their lives good, by way of their own effort . . .

What is crucial, however, is that NHI and similar paternalistic programs of government are morally indefensible because they use force to subdue people so as to achieve otherwise worthy goals. Again,

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

never mind contrary practices which are clearly widespread. The moral issue cannot be avoided and the moral principle in terms of which NHI is an immorality *par excellence* is incontrovertible. To use force against people who have not themselves used force against others is evil. It is also, incidentally, a violation of due process of law—condemning people without proving them guilty so that penalizing them would be justified. That some of these people may not be nice does not matter. Those are the risks of a free society.

TIBOR R. MACHAN
State University College
Fredonia, New York 14063

This kind of argument has been used against every law that the arguer finds undesirable. It is equally fatuous in all its applications. Every society is a battleground between the needs of the individual and the needs of the group. In our democratic system of government, laws are passed by the representatives of the people, and administered and enforced by other representatives. To call the enactment, administration and enforcement of any particular law "morally indefensible," or "plain theft" is a matter of opinion. But to say that such laws are "violations of the due process of law" or "the use of force" against citizens is arrant hyperbole. Anyone who believes that *must logically be a revolutionary, actively seeking the overthrow of our*

SCIENCE FICTION analog SCIENCE FACT

ATTENTION SUBSCRIBERS

Notify ANALOG (and Post Office) when you move. For fastest service on address change and any complaint, attach an old Analog mailing label or print clearly your old address here.

OLD ADDRESS (attach label here if available)

Name
(please print)
Address
City
State Zip

Print your NEW ADDRESS here, including Zip Code. Allow 6 weeks for change to become effective.

Name
(please print)
Address Apt.
City
State Zip

☐ 1 year: $ 9.00
☐ 2 years: $16.00
☐ 3 years: $21.00

These rates are for U.S. & Possessions. Canada and Mexico, add $1.00 per year; elsewhere, Analog is $12.00 per year.

☐ new subscription
☐ renewal

☐ Payment enclosed
(Make check or money order payable to Analog)

analog Boulder, Colorado 80302 3001

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

entire system of government—because it is the system that passes such laws. But such arguments are never used against laws designed to protect private property, regulate narcotics traffic, or enforce public safety. Somehow it's only the laws that take tax dollars from the wealthy and distribute them (in theory, anyway) to the poor that get condemned as "plain theft." If a citizen supports the national, state and local governments; if the citizen votes to elect representatives to run these governments; if the citizen expects these governments to protect the rights guaranteed in the Constitution—then that citizen has agreed to a "social contract." The citizen has the right to protest to his representatives about laws he doesn't like; but a law regulating National Health Insurance is no more immoral or aggressive than a law prohibiting jaywalking. And probably, knowing the way bureaucracies (both governmental and medical) perform, the NHI laws will be just as effective in reaching their goals as the anti-jaywalking laws are. ■

"Children of Dune" by Frank Herbert will begin in our January 1976 issue. Don't miss it!

EDITORIAL *continued from page 6*

fiber be in order to be useful for making a rope?

The question is not meaningless; if we try to make fibers each only 1/100th of an inch long into rope, we won't get anywhere. If we insist that only fibers ten feet or more in length can be used, there are going to be damn few ropes made of natural fibers.

Wayne Batteau, my information-theory specialist friend at the Harvard Applied Science Department, gave me an English translation of a mathematical theorem that's a gem: If there are two perfectly useless things to do, and a useful thing to do that lies between them, then there is a best thing to do. (The mathematical theorem is "If a function passes through zero twice, and has a positive value between, then there is a maximum.)

This is one of those "Why of course, that's obvious" things that everybody knows . . . but few have Wayne's genius for formulating clearly.

You can't make rope from fibers of zero length, and it's useless to wait for fibers of infinite length—but somewhere between there's a rational thing to do—and therefore an optimum length.

Equally, you can't draw conclusions from no evidence, and it's

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

futile to wait for *all* the evidence in any real problem; "all" in a real-world situation would mean several orders of infinity of data. (You couldn't think with that much evidence, even if you had it. Try thinking with the minute, exceedingly limited data that constitutes the sum of all information in the New York Public Library, for example.) Peg's "childish" problem is exceedingly cogent; "How much evidence is 'enough evidence'?"

The rope-fiber problem we can visualize more readily. Suppose we try to make a rope from nylon fibers, each one inch long. Nylon fibers are exceedingly smooth, and have a very low coefficient of friction. (Nylon makes wonderful bearings for small machines, as a result.) If we made a rope of one-inch nylon fibers, the darned fibers are so slippery that the rope would slip apart, long before the extremely strong, tough nylon fibers broke.

Wool fibers, on the other hand, have microscopic scales on them; any housewife knows that if wool fibers are wetted, and then worked against each other, they lock together, or "melt" into an un-disentangleable mass. A rope made of one-inch wool fibers would *not* slip apart; instead, the tensile strength of the wool fibers would be exceeded, and the individual fibers would themselves break.

In the reasoning problem, the cohesion between fibers represents the analogical relationship between a chain of logic, and the real-world system being considered. Each chain of logic is itself a fiber; the cross-correlation between them is the inter-fiber cohesion. For sound, powerful, flexible thinking, we need rope-type thinking—because logic long enough to reach from A to Z in one continuous fiber . . . doesn't happen very often.

Intuition appears to be a rope-reasoning technique. It works with less data-of-one-kind, and more cross-correlation of data-of-several-kinds. Thus a woman, who has a far greater tendency in that direction, frequently reaches a perfectly correct conclusion on the basis of data that is inadequate for logic, and is, moreover, inaccurate, irrelevant, and unreliable.

Trouble is . . . ropes break, just as chains do. And, moreover, a rope may be sound and useful, though worn; many of the individual fibers may have broken, yet still the rope is perfectly sound. But somewhere along the way, too many fibers will have broken, and the rope will break. With a chain of logic, it's easy to see that there's a broken link; with intuition, it's darned hard to prove that the rope broke—until you can specify the meaning of "enough evidence."

Intuition has, in consequence, been demeaned, and rejected. It's exceedingly tricky, and can get you into a lot of trouble. But it can also get you out of a lot!

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Peg, as I have mentioned, is a frustratingly efficient expert at intuition, and has been of devastating assistance in our research.

Now, one of the characteristics of a rope is that it has great tensile strength . . . and, at the same time, very little rigidity. A solid steel bar is more readily understandable (apparently! ask the solid-state physics boys, though!) but the steel bar will break, if it is bent. (All right—we'll make it a cast iron bar, then!) The greater the rigidity, the greater the fragility. But the strength of the structure is more readily explainable, more understandable, and therefore more communicable.

Here's where we get to human personalities. Given: A human being who has a cast-iron rigidity, instead of a ropey strength. This individual cannot bend, cannot adjust himself, but can have great persistence, determination, and can accomplish greatly. So long as such a person has his direction-of-strength along the line of the major forces applied to him, he won't break, and will be a rock of strength and dependability.

But don't stress him sidewise; when his limit is reached he'll crack suddenly and completely.

I suggest the following: There are human beings to whom the concept "I was wrong" is inherently impossible. Their thinking is characterized by *no* cross-correlation; if the individual did A under circumstances M, and then someone does A to him under circumstances M—*the guy will scream "Unfair!"* Reason: A under circumstances M is "fair" when he does it, and hurts X, but there is no cross-correlation with A under circumstances M when X does it to him. He makes a sharp discrimination on the basis I-passive and I-active, and negates any correlation between them. These individuals quite literally *cannot* see that "I was wrong" could be a valid concept.

It is perfectly, absolutely, and logically true that every individual in the universe is an absolutely unique entity. You *are not* me. In strict, formal logic, then, what is true-for-you is, strictly, not true-for-me. There is, then, absolutely valid strict-logic basis for the personality with the viewpoint of "I was wrong" having no meaning. Since I *am in fact* different from you, it follows that what is logically true for me—and this is extended to include "good for me to do"—must differ from what is true for you. If we discard analogical thinking totally, in other words, then you cannot say that because *I think* hitting you in the shins is amusing, there is any reason at all why you should think kicking me in the shins is amusing too.

Now, hypothetical thinking and analogical thinking are damn closely related. Hypothetical thinking involves trying different-but-similar ideas—which means analogous-but-different.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

I have a hell of a suspicion that many people are incapable of generating, in their own minds, the concept "I was wrong." If someone ever generates it for them, and gets it into them somehow, I suspect they'll crack up like a bent piece of cast iron.

If such an individual encounters absolute and inescapable proof of his own mistake—he's in extreme danger.

I've been thinking of it in terms of the individual who has spirit—who knows his/her rights and will fight for them. To such a person, failure of his orders to produce the intended results proves only that the individual who carried them out didn't do it right. They never make a mistake; they can tell you that. When they carry out an idea, and it doesn't work, it is because someone deliberately sabotages their efforts. Such a person, confronted by a more powerful individual who physically compels action which forces acknowledgement of a mistake, knows he is in the hands of a madman, and humors him. But *never*, under any circumstances whatever, does this type acknowledge "I made a mistake." I believe it is an honest, genuine, mental incapability—that the concept simply can't be generated by their minds.

In the proper environment, such people can be enormously useful; they can be absolutely relied on to carry out, without deviation, whatever program they have accepted as "right." Trouble arises, however, when they're on the wrong track; then you get a Hitler, Torquemada, or a Senator Joseph McCarthy.

Somewhere in here, there lies explanation of the psionic phenomena Hieronymous, and the others have been working on. So far, we've worked only with logical machines; their gimmicks work on cross-correlative machines. I suspect—and don't follow the rules of logic, naturally. *Distance* isn't a criterion in the newer system; something else is—and we can't yet name it. When we can, we'll be a long way toward being able to manipulate it. I have a suspicion it involves a new kind of thinking with respect to the concept "similarity." Two things that are very similar in quality, remain very similar in quality, and to the same degree, no matter how close or far apart they may be in terms of distance.

And . . . note that logic has never been able to handle the "quality" concept—only the "quantity" concept.

One might say "The quality of mercy is not strained" by logic; it's strained *out!* So is any other quality. We can specify a quantitative identity between twelve eggs and twelve mountains—but can't specify the qualitative similarity between a chicken and an egg . . . though it is self-evident that there is a similarity! ■

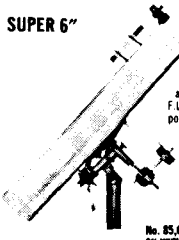
LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

LIVE IN THE WORLD OF TOMORROW...TODAY!

A BETTER LIFE STARTS HERE

(And our FREE CATALOG is packed with exciting and unusual values in hobby, electronic and science items—plus 4500 finds for fun, study or profit . . . for every member of the family.)

SUPER 6" SPACE CONQUEROR



Superb Astronomical Reflector—Up to 576X Capable of revealing faint stars of nearly 13th magnitude, split double stars separated by less than 1 sec. of arc. Features 48" F.L. aluminized & overcoated 6" f/8 ground and polished parabolic mirror (Pyrex®) accurate to ¼ wave. 6X achromatic finder scope. 3 eyepieces—wide field 48X Kellner, ¼" 192X Ramsden, & a Barlow to double & triple power—rack & pinion focusing mount. 47¾" *aluminum tube. Electric clock drive w/manual slow-motion control. Setting circles.* Heavy-duty equatorial mount. Pedestal base. Compares to $350–$400 models.

No. 85,085 (Shp. Wt. 68 lbs.).....$285.00 F.O.B.
6" WITHOUT CLOCK DRIVE No.85,187A...$249.50 FOB
4¼" REFLECTOR (45X to 135X)
No.85,105A.....$149.50 FOB
4¼" WITH CLOCK DRIVE No.85,107A.....$189.50 FOB
3" REFLECTOR (30X to 90X) No.85,240A.....$ 49.95 Ppd.

KNOW YOUR ALPHA FROM THETA!

For greater relaxation, concentration, listen to your Alpha-Theta brainwaves. Ultra-sensitive electrode headband slips on/off in seconds-eliminates need for messy creams, etc. Atch'd to amplifier, filters brainwaves, signals beep for ea. Alpha or Theta wave passed. Monitoring button simulates Alpha sound; audio & visual (L.E.D.) feedback. Reliable, easy-to-use unit—comparable to costlier models. Completely safe. Comprehensive instruction booklet.

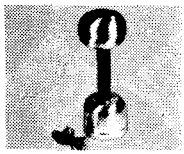
No. 1635A (8x3x4"; 24 oz.) ....$149.50 Ppd.
No. 71,809A Low cost "starter" $55.00 Ppd.

THE FINAL OPTICAL ILLUSION!

Now you see it, but you don't. Put a coin, ring, rock, any small thing inside the unit—it seems to be resting on the *mirrored* top. *Look at it, smell it, shine a light on it, even photograph it* AND it's really there. Try to **touch** it, you'll get only thin air! You & everyone else will be astounded by this Parabolic Display Unit (it's science and art) that produces an amazing optical effect. Scientists call it a 3 dimensional real image. Very exciting!

No. 72,074A (m/4" dia. displ. stand).....$45.00 Ppd.

HI-VOLTAGE VAN DE GRAAFF GENERATOR



Electrostatic low-amp type. 200,000 volt potential, yet completely safe. Demonstrates lightning, St. Elmo's fire, repulsion of charges, electrostatic dust collection, many other electrical wonders. Meter. 110V. 60 cycle, AC. Humidity range, 0-90% Current, 1.5 to 2.5 microamps. Aluminum base, frame and charge collector. Unbreakable plastic. Insulating column. Ht. 17" dia. 6¾". Full instructions.

Stock No. 70,264A.....$72.00 Ppd.

TOTAL KIRLIAN PHOTOGRAPHY SET

Explore "aura" photography w/superb new **self-contained** Kirlian Electrophotography Research Unit. Terrific value—introduced at $99.95 ($140 in Sept.)! Has everything but vinyl photo changing bag. Ideal for color or b&w 35mm sheet or Polaroid film for photos up to 5x7" **all without camera or lens.** Variable voltage 12v to 32kv. Ultimate safety design—fully encased in plastic; patented electronics. Instrs

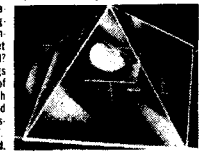
No. 72,104A (3x5½x7¾").....$99.95 Ppd.
No. 42,240A (CHARGING BAG)..$6.50 Ppd.

A 1-YR. BIO-RHYTHM ANALYSIS!

Know for the next **12 mos.** when to expect *days of great energy & exactly when your* physical & creative talents surface to do your best for happiness, success. Foresee your **off** days to avoid poss. errors or accidents! Personalized Bio-rhythm Chart-Report (by computer) gives you an accurate preview of your physical, emotional & intellectual high & low periods with variations, corresponding to your inner life. Send name, add., birth date (day, mo., yr).

Stock No. 19,200A.....$15.95 Ppd.

MYSTERY OF ENERGY AND AGING



Science fact or farce? Can our Great Pyramid unlock the mysteries of energy & aging—show that the ancient Egyptians contradicted nature? Did someone really get 85 shaves from a blade kept in a pyramid? Test claims like meat not rotting, things not rusting! Users of exact scale models of Cheop's pyramid oriented to true North claim all sorts of strange phenomena based on resonating energy. Duts is already assembled, ¼" see-thru acrylic, 6x9¼x9¼".

Stock No. 71,817A.....$20.00 Ppd.

MAIL COUPON FOR GIANT FREE CATALOG!

164 PAGES • MORE THAN 4500 UNUSUAL BARGAINS

Completely new Catalog. Packed with huge selection of telescopes, microscopes, binoculars, magnets, magnifiers, prisms, photo components, ecology and Unique Lighting items, parts, kits, accessories — many hard-to-get surplus bargains. 100's of charts, illustrations. For hobbyists, experimenters, schools, industry.

EDMUND SCIENTIFIC CO.
300 Edscorp Building, Barrington, N. J. 08007
Please rush Free Giant Catalog "A"

Name_____

Address_____

City_____ State_____ Zip_____

COMPLETE AND MAIL WITH CHECK, M. O. OR CHARGE NO.

EDMUND SCIENTIFIC COMPANY
300 Edscorp Building, Barrington, N.J. 08007

How Many	Stock No.	Description	Price Each	Total

☐ SEND FREE 164 PAGE CATALOG "A"

Add Handling Chg.: $1.00, Orders Under $5.00. 50¢, Orders Over $5.00

☐ Charge my BankAmericard *

I enclose ☐ check ☐ money order for TOTAL $

☐ Charge my Master Charge *

My Card No. Is

Interbank No.

Signature_____

Card Expiration Date_____ NAME_____

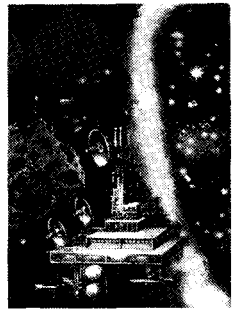
30-DAY MONEY-BACK GUARANTEE. You must be satisfied or return any purchase in 30 days for full refund

*$15.00 minimum

ADDRESS_____

CITY_____ STATE_____ ZIP_____

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED



Analog covers available

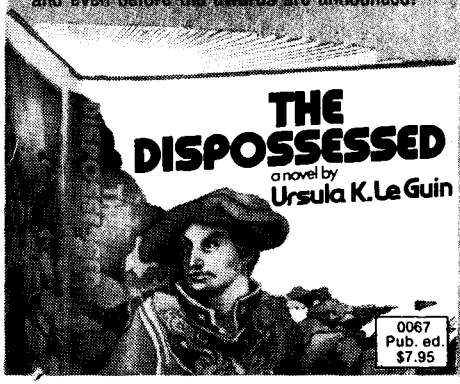
Thanks to your great interest and demand, we now have available for sale a limited number of reprints of our 1974 covers. The reprints are in the same colors as originally published, without the printed material overlaying them. The reproductions are bordered with white stock, suitable for framing. Size is 9″ x 12″. Individual covers will cost $1.75. A set of two covers will be $2.50; three-cover sets, $3.25; all four covers, $4.00. Order now!

See page 163 of this issue for coupon.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

This Year's Nebula Winner!

THE DISPOSSESSED is speculative fiction at its finest. Profound. Mind-expanding. Engrossing. And, like most winners of the Hugo and Nebula Awards — SF's equivalents of the Oscars and Emmys — it's a selection of The Science Fiction Book Club, it's yours right now, if you wish, as one of four books for 10¢ when you join. Every novel on this page is an award winner, every collection includes a prize story. And, as a member, you can depend on something else: you'll be offered most of Science Fiction's 1976 prize winners—at special low Club prices, and even before the awards are announced!



How the Book Club Works:
When your application for membership is accepted, you'll receive your choice of 4 books for just 10¢ plus shipping and handling. If not absolutely fascinated, return them within ten days — membership will be cancelled and you'll owe nothing.

About every 4 weeks (14 times a year), we'll send you the Club's bulletin, **Things to Come**, describing the 2 coming Selections and a variety of Alternate choices. If you want both Selections, you need do nothing; they'll be shipped automatically. If you don't want a Selection, or prefer an Alternate, or no book at all, just fill out the convenient form always provided and return it by the date specified. We try to allow you at least ten days for making your decision. If you do not get the form in time to respond within 10 days, and receive unwanted books, return them at our expense.

As a member you need take only 4 Selections or Alternates during the coming year. You may resign any time thereafter, or remain a member as long as you wish. Most books are only $1.98 plus shipping and handling. Some extra value selections are slightly higher but always much less than Publisher's Editions. Send no money. But do send the coupon today.

Any 4 Hugo & Nebula Award winners for 10¢ with membership

Science Fiction Book Club 45-S142
Dept. HR108, Garden City, New York 11530

Please accept me as a member. I agree to the membership plan as described above. Send me, as a beginning, the 4 books whose numbers I have indicated below, and bill me just 10¢ (plus shipping and handling). I agree to take 4 additional books at low club prices in the coming year and may resign anytime thereafter.

Mr.
Miss
Mrs. (Please print)

Address _____ Apt. # _____

City _____ State _____ Zip _____

The Science Fiction Book Club offers its own complete hardbound editions sometimes altered in size to fit special presses and save members even more. Members accepted in U.S.A. and Canada only. Canadian members will be serviced from Toronto. Offer slightly different in Canada.

6270. **Dune.** By Frank Herbert. Hugo 1966; Nebula 1965. Pub. ed. $5.95

1032. **Rendezvous With Rama.** By Arthur C. Clarke. Hugo 1974; Nebula 1973. Pub. ed. $6.95

6379. **The Left Hand of Darkness.** By Ursula K. Le Guin. Hugo 1970; Nebula 1969. Pub. ed. $4.95

6023. **The Gods Themselves.** By Isaa Asimov. Hugo 1973; Nebula 1972. Pub. ed $6.95

6130. **A Time of Changes.** By Robert Silverberg. Nebula 1971. Spec. Ed.

Note: Each of the following collections of novellas, novelettes, and short fiction include at least one Hugo and/or Nebula Award winner.

8532. **The Hugo Winners. Vol. I & II.** Ed. by Isaac Asimov. Pub. ed. $15.45

8037. **Again, Dangerous Visions.** Ed. by Harlan Ellison. Pub. ed. $12.95

2337. **New Dimensions 3.** Ed. by Robert Silverberg. Spec. Ed.

0935. **Universe 3.** Ed. by Terry Carr. Pub. ed. $5.95

2717. **Nebula Award Stories Seven.** Ed. by Lloyd Biggle. Pub. ed. $6.95

0075. **Universe 4.** Ed. by Terry Carr. Pub. ed. $5.95

4309. **Dangerous Visions.** Ed. by Harlan Ellison. Pub. ed. $6.95

4432. **The Wind From The Sun.** By Arthur C. Clarke. Pub. ed. $5.95

6346. **Sturgeon is Alive and Well.** By Theodore Sturgeon. Pub. ed. $4.95

2782. **The 1974 Annu World's Best SF.** Ed. by Donald A. Wollhei Spec. Ed.

1164. **The 1973 Annu World's Best SF.** Ed. by Donald A. Wollhei Spec. Ed.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED